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PROGRESSIVE POULTRY RAISING

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National Poultry Associations

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Blue Andalusian Club of America, Voris Morrison, *Secretary*, Ramsey, Ill.

United Ancona Club, R. W. Van Hossen, *Secretary*, Franklinville, N. Y.

International Baby Chick Assn., Fred H. Thayer, *Secretary*, Baltimore, Md.

National Bantam Association, J. Hart Welch, *Secretary*, Douglaston, L. I., N. Y.

American Game Bantam Club, J. K. Brokaw, *Secretary*, Somerville, N. J.

American Light Brahma Club, Harvey C. Wood, *Secretary*, Bound Brook, N. J.

American Buckeye Club, E. F. Trimble, *Secretary*, Benton, Ky.

American Buttercup Club, H. J. Lalone, *Secretary*, Potsdam, N. Y.

American Cornish Club, Fred H. Schrer, *Secretary*, Utica, N. Y.

National American Dominque Club, C. W. Boose, *Secretary*, 29 Park St., Lewiston, Mo.

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National Game Club, E. J. W. Dietz, *Secretary*, 736 Cornelia Ave., Chicago, Ill.

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American Houdan Club, Daniel P. Shove, *Secretary*, Fall River, Mass.

Hamburg Fanciers Club, Robert C. Morse, *Secretary*, 19 Congress St., Boston, Mass.

American Incubators Manufacturers Assn., E. L. Coatsworth, *Secretary*, care Queen Incubator Co., Lincoln, Nebr.

American Java Association, Seth W. Morton, *Secretary*, P. O. Box 587, Albany, N. Y.

National Black Langshan Club, Wm. Buddenhagen, *Secretary*, Brooklyn Station R. R. 2, Cleveland, Ohio.

American Black Leghorn Club, G. B. Wadsworth, *Secretary*, Hempstead, L. I., N. Y.

American Buff Leghorn Club, Geo. S. Barnes, *Secretary*, Battle Creek, Mich.

American Rose Comb White Leghorn Club, J. M. Chase, *Secretary*, Wellkill, N. Y.

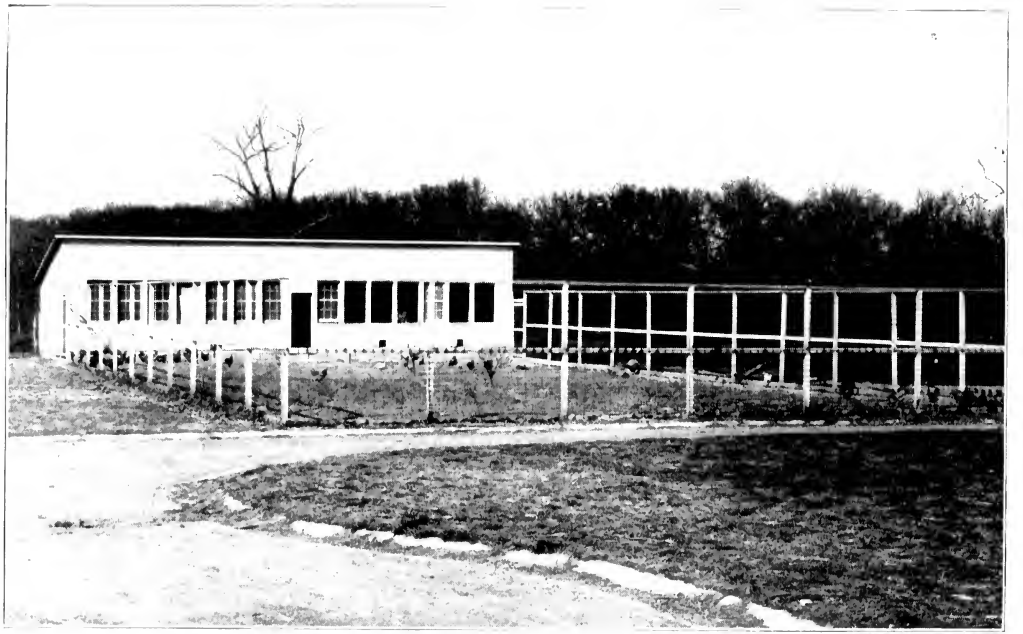
American Single Comb Brown Leghorn Club, C. C. Gresham, *Secretary*, Parkville, Mo.

National Single Comb White Leghorn Club, A. F. Rolf, *Secretary*, Box 1104, New Orleans, La.

American Single Comb White Minorca Club, G. G. Truman, *Secretary*, Perrysville, Ohio.

International Single Comb Black Minorca Club, H. S. G. McCartney, *Secretary*, Hall of Records, Los Angeles, Cal.

(Continued on back cover)



A good type of an all-round farm poultry house.

A Prize White Plymouth Rock.

PROGRESSIVE POULTRY RAISING

BY

WILLIAM A. LIPPINCOTT

PROFESSOR OF POULTRY HUSBANDRY
KANSAS STATE AGRICULTURAL COLLEGE

ARMOUR'S LIVESTOCK BUREAU

EDWARD N. WENTWORTH, Director

UNION STOCK YARDS

CHICAGO, ILLINOIS

1923

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Introduction

POULTRY has been one of the chief sources of human food the world over, even during the days before history was recorded. In early America nearly every family had a small flock, but the rapid industrial expansion of the United States following the Civil War brought about a congestion of our population into restricted areas which prevented the production of eggs and poultry by each family.

Consequently, a commercial demand developed from these people that was fundamental in the growth of the modern marketing services, especially artificial refrigeration. The discovery that eggs can be preserved when kept cold, the building of cold storage warehouses to prepare for periods of scarcity, and the invention of the refrigerator car, have all played their part in supplying the city population with poultry necessities. Armour and Company has been no small factor in the service of storing and transporting these foods. Every family now considers eggs a daily necessity, and, thanks to modern methods, the supply is daily forthcoming.

This development in marketing poultry produce has had the direct effect of increasing production. Instead of growing just enough poultry to supply the family needs, it has been found profitable to enlarge this activity to a point that provides a sure and steady source of income. The average annual return from sales of poultry and eggs for all farms in the United States is approximately $140, while many general farms receive $500 to $1,000 from this source. The value of all poultry products annually produced in America is now over one billion dollars.

This book is designed to foster the production of poultry products of a kind needed to meet the demand of the consuming public, to supply a higher grade fowl for the farmers' tables and to bring a higher return to those engaged in poultry raising. The author, William A. Lippincott, is Professor of Poultry Husbandry at the Kansas State Agricultural College and Secretary of the International Poultry Instructors' and Investigators' Association. He is the author of "Poultry Production," one of the most widely used text-books on poultry raising, and the courtesy of its publishers, Lea & Febiger, Philadelphia, is hereby acknowledged in permitting the use of certain material from this work.—H. S. JOHNSON, *Manager;* Butter, Cheese, Egg and Poultry Department, Armour and Company.

Chapter I

History of American Poultry Production

Place in System of Farming—A farm without poultry is unusual. In early days a home without it was just as much so. With the growth of the towns and cities, the development of the refrigerator car and of the egg packing industry, with its cold storage facilities, the town and city dwellers came to depend upon the people of the open country for the production of poultry and eggs.

In the beginning, the farmer or his wife simply sold the surplus from the flock which supplied the family needs. This is still largely true, though the size of the flock has grown and the surplus has increased as the prices for poultry products have risen. Fowls have received increasing recognition as a means of marketing waste grains, grasshoppers and other insects. Moreover as consumers of specialized farm crops, fowls provide one of the most economical means of transforming grains and cereals into high priced products.

Place of Poultry Husbandry in Commerce—Unfortunately for consumptive demand the production of poultry and eggs is largely seasonal. The bulk of the year's lay comes between the first of February and the first of August in most states. The poultry crop comes to market between the first of August and the Holidays, yet people need these highly perishable products the year around. It is artificial refrigeration which makes it possible for the farmer to sell eggs in April and live poultry in November at prices that are profitable, and for city folks to buy eggs in December and broilers in February at prices which are not prohibitive. The cold storage houses are the city's cellars.

Early Poultry History in America—Poultry raising in the United States has been a home industry from the very beginning. It appeared in this country at least as soon as the first homes were established in, Jamestown in 1607. The entire product of the flock, including the feathers, was used at home. Poultry production has never been a frontier occupation in the sense that beef production has, or to a less degree, wheat production. Both of these tend ultimately to be replaced by crops yielding more food units per acre. Eggs and poultry have always been, for the most part, by-products of a general agriculture. It was not until long after most of the present-day industries which emanated from the farm, had become fairly well established, that poultry raising, with its associated industries, began to be accounted of major importance and recognized as of broad commercial value.

This was largely due to two associated causes. The first was the high perishability of both poultry and eggs, and the second was the poor means of transportation in early days. The commercial development of the industry is entirely dependent upon present-day railroad facilities, and the history of its development has very largely paralleled the history of railroad development, and has advanced in step with the improvement of refrigerator cars. It was not until about 1869, when the refrigerator was first brought into use for long distance hauling, that means were afforded for transporting poultry products from the farm to distant cities, and production, beyond that demanded by home needs, became an object, and poultry a source, of any considerable money income.

Later Development of Poultry Production—The early phase of the development of poultry production may be designated as the "home poultry" phase. With the advent of the refrigerator car and the possi-

bility of marketing surplus products in distant cities there appeared a growing tendency to produce more eggs and poultry on farms than were necessary for home needs, and to market the surplus. This was the beginning of the "farm poultry" phase in the history of poultry production. It is the phase which predominates over much of the United States to-day.

In some sections, however, the evolution has gone further and farms upon which poultry and eggs are the principal products and main source of income are quite common. Such sections have already entered the third and last phase of the industry's development in which poultry has become a specialty and which may be referred to as the "poultry farm" phase.

The outlet for poultry products has from the first been a steadily increasing one, *and the need to-day is for more, larger, and better farm flocks.* The general farm that is understocked on poultry is not fully efficient, because it is failing to utilize its by-products. *Worms, weedseeds and windfalls can command good prices when transformed into poultry and eggs.*

Kind of Stock for the Farm—Except in the case of the strictly meat birds, such as the turkey, duck (with the possible exception of the Runner) and goose, the return from the eggs sold constitutes about two-thirds of the income for poultry products, while the carcasses sold, whether alive or dressed, furnish the other one-third. The egg is undoubtedly the more profitable of the two products and the farm flock should always be good layers. Having in mind his own home needs, however, the farmer usually wishes stock that furnishes a sizable carcass as well as a good number of eggs. He should also have in mind that quick gains are the cheapest gains with chickens as well as hogs and cattle, and early maturity an asset to any flock.

Chapter II

Breeds of Poultry

Early American Poultry—There is little information to be found concerning the status of poultry previous to the rise of the breeds in the middle of the last century. According to Carver's Principles of Rural Economics, "with the exception of the turkey all our farm animals and poultry were imported from the Old World. The first to reach the New World were brought by Columbus on his second voyage in 1493. * * * Chickens, ducks and geese are known to have been brought at that time." According to Robinson, the ordinary native stocks of fowls, ducks, geese and turkeys in America at the time of the general awakening of interest in improved poultry and for some years after, were, even when compared with the average mongrel stocks of to-day, small birds of distinctly inferior table qualities, and usually inferior also in egg production. This degeneracy of stock was due to the common practice of selecting for the table first. That such practice, persistently followed, did not quickly run the stock out was due to these saving circumstances: (1) the natural tendency of the stock to improve under the very favorable conditions which small flocks at liberty on farms enjoyed, and (2) the occasional introduction of blood of improved native stock.

Now and then a person particularly interested in poultry would breed his flock to one type or color, but the prevailing belief was that the best breeding was that which combined the greatest variety.

Breeds and Classes—There are four classes of chickens that have found favor on general farms. These are the Asiatics which include the Brahmas,

Cochins and Langshans; the Mediterraneans which include the Leghorns, Minorcas, Andalusians, Anconas and Spanish; the Americans which include the Plymouth Rocks, Wyandottes, Rhode Island Reds, Dominiques, Buckeyes, and the Javas; and the English which include the Orpingtons, Dorkings, Sussex, Cornish and Redcaps.

The Asiatic breeds have not been as popular for general farm use of late as they formerly were. They are for the most part large, slow-maturing birds which lay only indifferently and are greatly given to broodiness. The loose, heavy feathers also furnish an ideal refuge for lice and render it more difficult to keep the flock free from parasites.

Of the American breeds the Plymouth Rocks, Wyandottes, and Rhode Island Reds are found in farm flocks with frequency. Members of these breeds are intermediate in size between the Asiatics and the Mediterraneans, giving a carcass of desirable size and quality for marketing or for home use. While the average egg production of these breeds is not so high as in the case of the Leghorns, there are strains and families which are great producers. At the Vineland, N. J., contest a White Plymouth Rock laid 301 eggs during her first laying year and a Barred Plymouth Rock accomplished the feat of producing 501 eggs in two years, these being the highest one-year and two-year records at the contest. *There appears to be no reason why a satisfactory egg production and a sizable carcass should not be found in the same flock.*

Among the English breeds the Orpington is the only one extensively used for the farm flocks. The Orpingtons are quite similar in general characteristics to the American breeds, being a little heavier than the Plymouth Rocks, a little slower maturing and rather more given to broodiness. Like the Plymouth Rocks, they are fair layers of rather light brown eggs.

The Mediterranean breeds are smaller than the English, American and Asiatic breeds and much more active than the latter. Taking the White Leghorn as representative of the class (this variety probably being bred in larger numbers than all the other Mediterraneans combined), the average egg production is larger than for any other class. The Leghorn, however, finds its popularity on specialty farms where eggs are the main cash crop, rather than on general farms. The Leghorn has not proved popular as a general farm fowl largely for two reasons. The first is that as usually bred, it furnishes a rather small carcass for table use and second, it is so flighty as to be difficult of control. It is possible, however, to breed a Leghorn of good size which is fairly desirable for table use. The fact that it lays a pure white egg which is in demand in certain extreme Eastern and Western markets makes it desirable in those sections.

Egg Laying Records of the Common Breeds—A recent bulletin (No. 338) from the New Jersey Agricultural Experiment Station gives some very interesting figures on the representatives of the various breeds entered in the egg laying contest at Vineland, N. J. The Plymouth Rocks included the Barred, White and Columbian varieties. The Wyandottes were White and Columbians. The Rhode Island Reds were all Single Combs and the Leghorns were mostly Single Comb Whites, with a very few Single Comb Buffs and Blacks. In judging the results of this contest it should be remembered that the figures show *the returns from eggs alone and not what the result would be upon marketing the flock after the profitable egg producing period.* The numbers of representatives of each breed, the average first-year production, feed consumption and financial returns were as follows:

Table I

	Plymouth Rocks	*Wyandottes*	*Rhode Island Reds*	*Leghorns*
Number of Birds	170	150	80	600
Number of Eggs per Bird	155.0	144.3	150.6	169.7
Per Cent Production	42.5	39.5	41.2	46.5
Per Cent of 200-Egg Hens	14.7	8.6	11.2	22.8
Weight of Eggs per Bird (lbs.)	19.73	17.98	19.74	21.36
Average Weight of Birds (lbs.)	5.94	4.99	5.31	3.49
Feed Consumed per Bird (lbs.)	89.78	80.34	86.56	76.19
Average Cost of Feed per Bird	$2.52	$2.30	$2.47	$2.19
Pounds of Feed to 1 pound of Eggs	4.6	4.6	4.5	3.5
Actual Price per Dozen Eggs	$0.43	$0.43	$0.43	$0.46
Actual Value of Eggs per Bird	$5.46	$5.22	$5.44	$6.49
Actual Returns above Feed per Bird	$2.91	$2.92	$2.97	$4.30

Choosing a Breed—The choice of the breed or variety is largely one of personal preference after one has decided on the class of birds that will best meet his needs. If a general purpose fowl for the average farm that will produce a good number of eggs and furnish a sizable carcass is looked for, accompanied by fairly quick growth and early maturity, one of the American or English breeds will meet the need. If one looks forward to making eggs the important cash crop, one of the Mediterraneans will probably be chosen. It makes very little difference in many sections what particular breed and variety is chosen, the important problem of the progressive poultry raiser being to secure the best breeders possible of the breed and variety selected. In some sections, however, varieties showing black pin feathers are being discriminated against.

It is not always easy to get hold of good breeding stock, from the farmer's standpoint, though fortunately the agencies for helping him in this regard are increasing rapidly. Laying contests conducted by a number of the State Agricultural Experiment Stations are proving a great help. Many of the other stations are compiling lists of breeders who carefully trap-nest and pedigree their flocks in regard to egg production.

Chapter III

Poultry Breeding

Methods of Breeding—Characteristics to be desired in a farm flock are in the order of their importance: vigor, high production and uniformity. It is possible to secure these by the use of vigorous purebred males from high producing strains with flocks of mixed breeding. In a recent test at the Kansas Agricultural Experiment Station it was possible to increase the average egg production of what was a mongrel flock from 98 to 155 eggs per year and secure uniformity instead of diversity by using Barred Plymouth Rock males from trap-nested stock for three successive years. Where White Leghorn males were used for the same length of time, the improvement of egg production was found to be even more marked. The original mongrel hens gave an average production of 72 eggs. After grading by the use of purebred single comb White Leghorn males for three years the flock average was increased to 192 eggs. The original mongrel flocks were a mixture of red, black and buff. The third generation grades were pure white. The grade Leghorns, however, were smaller than the grade Plymouth Rocks and not as desirable from the market standpoint.

While it has been proven that a poor-laying mongrel flock containing several types and colors may be made over into a high-producing flock of uniform color that is just as desirable from the market standpoint as purebreds, within the space of three years, the fact should not be overlooked that a considerable source of profit may come from selling breeding stock. This can only be done satisfactorily where one keeps purebred stock. It costs no more to house and feed a purebred flock than it does a bunch of mongrels or grades and where

stock can be disposed of at satisfactory prices, the purebred flock will prove much more profitable.

Culling—Whether the poultry producer keeps purebreds or grades, he will increase his profits very materially by culling his flock closely every year. Though the trap nest is the most accurate means of selecting the best layers in the flock, its use is only practicable for those who make poultry breeding a specialty. The trap nest usually has no place on the general farm. On the average, the pullet laying year is more profitable than any other. Yearlings and two-year-olds are likely to be kept at an actual loss unless they are carefully culled.

The best time of year in which to do the culling is late July, August and early September. This comes from the fact that the poor layers are usually early molters while the better layers as a general thing do not molt until November or December. In general, therefore, the poor producers are the best lookers in the late summer, while the high layers are likely to appear old and ragged. The body feathers change first and the main wing feathers last. As it requires about six weeks to grow the first new flight feather and two weeks more for each succeeding one and as hens seldom lay while molting, it is possible to estimate fairly closely how long it will be before they will get into laying condition again. This is done by counting the new flight feathers beginning at the elbow and subtracting the number of weeks indicated from 24. To tell the length of time since the hen stopped laying add up the number of new flights. The late molters will usually be birds of good vigor.

A strong consitution is so tremendously important in either the laying or breeding flock that even the late molters should be carefully scrutinized in this regard. Only females which exhibit activity and

vitality should be kept over for laying or breeding. All specimens that are scrawny, undersized, weak on the legs, light in weight, excessively fat, or which have deformities such as crooked legs, back or beak, should be eliminated. It is well to dispose of birds that have long toe nails, overhanging eyelids, or any defect which handicaps them in their search for food. The long slender head (crow head) or spindling shanks indicate the lack of thrift and vigor. Such individuals cannot be profitable producers. A bright red comb and wattles indicate a good circulation. The laying hen is a hustler and working all the time. She sings at her work and is usually more gentle and sociable than the non-layer.

In order to lay a large number of eggs a hen must have large organs of digestion and of reproduction. In the live bird these of course cannot be examined. It goes without saying, however, that an individual cannot have a large and well developed digestive and reproductive apparatus unless it also exhibits a capacious body. Capacity is indicated by a long keel (breast bone) and the long, deep and wide body.

When a hen is laying the point of the keel (breast bone) moves away from the pelvic bones (lay bones). When the hen is not laying these come closer together and are less pliable. The actual distance is comparative only and varies in different individuals, depending on the size and the breed. When the bird is laying, the pelvic bones (located just below and to either side of the vent) are quite far apart and pliable, whereas in a male bird or a hen that is not laying, they are quite close together. They are also quite thin due to the fact that fat is not deposited in this region. While the hen is laying heavily the skin of the abdomen is soft and pliable in a good layer and the flesh of this region is not firm and hard to the touch as in the case of a non-

layer, when considerable masses of fat are likely to be deposited here.

The abdomen should not hang down, indicating a fatty degeneration of the supporting tissues. Neither should it be tucked up, indicating lack of capacity. The latter condition is very frequently found when the keel is short. The vent is large and moist in a good layer.

In the yellow shanked varieties (all Americans and Mediterraneans except the black varieties), the yellow color, which is by no means limited to the shanks but is found in the skin as well, gradually disappears from the various parts of the body in the following order:

1. The vent.
2. The eye ring.
3. The beak, starting at the base.
4. The shanks, beginning at the toes and leaving the back of the hock the last.

A glance at the latter section will indicate how much the shank is bleached. Loss of color from the shanks indicates that a much longer period of laying has elapsed than loss of color from the other sections named. Generally a bleached shank indicates that there have been fifteen to twenty weeks of heavy production.

When laying, a hen's comb is comparatively large, red and warm to the touch. The wattles are also comparatively large and warm, apparently due to the functioning of the ovary. Therefore if the comb is small, limp and cool to the touch the bird is not laying. Frequently the comb of a non-layer is covered with a white scale-like crust.

The characteristics of high and low producers have been summarized in University of Missouri Extension Circular No. 70, as follows:

Characteristics of High Layers—The best producing hens will show all of the following characteristics:

1. Vigor—Strong, healthy, active, gentle and happy.
2. Molt—Not molting before October first.
3. Pigmentation—Shanks and beak pale. Ear lobes showing no yellow.
4. Quality—Skin soft, fine and velvety. Breast bone thin and of fine quality. Pin bones straight and flexible.
5. Laying condition—Abdomen soft and flexible. Vent moist and expanded. Body depth four fingers or more. Width of pin bones at least three fingers.

Characteristics of Poor Layers—The poor producers in the flock will show all of the following characteristics at culling time:

1. Vigor—Lazy, inactive, wild, cross.
2. Molt—Beginning to molt in July, August or September.
3. Pigmentation—Shanks and beak prominent yellow; yellow in ear lobes on Mediterranean breeds, such as Leghorns.
4. Quality—Skin thick, dry and coarse. Breast bone thick and blunt on the edge. Pin bones blunt and unyielding.
5. Laying Condition—Abdomen hard. Vent dry and puckered. Body depth less than three fingers. Pin bones less than two fingers apart.

The Breeding Pen—Where careful culling is practiced, the most satisfactory type of mating from the standpoint of egg production, is a highly vigorous cockerel from a family of high producers mated with yearling hens which molted late and gave evidence of good vigor and production. This applies whether one is keeping purebreds or is simply grading up his flock.

The number of females to be mated with one male varies with the class of stock. For the Asiatics it should be eight to ten. For the American and English classes it should be ten to fifteen and the Mediterraneans may be fifteen to twenty. The hens to be mated should be kept away from other males for at least three weeks prior to the saving of the first eggs for hatching, and should have associated with the males it is desired to breed from, for at least ten days, while two weeks is better.

Care of Eggs for Hatching—Successful hatching of eggs in incubators depends fully as much on the vigor and vitality of the parent stock and the care of the eggs before being put into the incubator as upon the incubator itself. Successful hatches can be expected only when the birds in the pens from which the eggs come are enjoying an abundant health. Poor hatches are probably caused more frequently by poor breeding stock than by poor incubators.

Eggs that are being saved for hatching should be of good size and normal in shape and color. The egg starts to develop at a temperature between 68 and 69° F. and should be kept where the temperature is below 65° F. until it is set. A good dry cellar usually furnishes the ideal place. The eggs should be turned over every day or two if they are kept any length of time before hatching. The sooner the eggs are incubated after being laid, the better, though they may usually be kept, if under proper conditions, for a week or even ten days without injury. If for any reason it is desirable to set dirty eggs they should be put into the incubator without washing. The probability of their hatching is better if they are not washed.

Incubating—The small incubator is fast replacing the setting hen in most sections of the country and in some sections is in turn being replaced by the mam-

moth incubator at the customs hatchery. Buying day-old chicks or having the eggs from the farm incubated at a hatchery is gaining in popularity.

The small lamp-heated incubator will continue to be used on most farms for a good many years to come, however. In purchasing an incubator it usually pays not to depend on the very cheapest makes. The difference in cost between a poor machine and a good one is small in comparison with the loss that may be caused by an inefficient hatcher. The machine should be set up in some room that is fairly uniform in temperature. This is most likely to be a cellar. It should be so located that the sun cannot strike it at any time of day and should be made perfectly level by the aid of an ordinary carpenter's level.

In the case of used machines care should always be taken thoroughly to disinfect with a 3 percent solution of any of the coal tar stock dips. If a spray pump is not available the work can easily be done by dipping a whisk broom in the disinfectant and flirting into the interior of the machine, making sure that the thermometer, regulator and the sides, top, bottom and all the trays are thoroughly drenched.

Directions for operating each make of machine are usually sent out by the manufacturers. While the directions vary somewhat for different makes, it is the intention of the manufacturer to give the directions which will bring the best results for his particular make of machine and they should, therefore, be followed unless some reason for varying from them is found.

At the beginning of every season it is safe precaution to test the thermometer and make sure it is registering accurately. This may be done by borrowing a physician's thermometer, heating some water to a temperature of about 106 F. and moving the bulbs of the physician's and the incubator thermometers back and forth through the water together. If they agree,

Fig. 1. Proper way to hold a hen for finding the distance between the pelvic bones.

Fig. 2. Showing the way to find the distance from the pelvic bones to the keel. (Courtesy T. S. Townsley, Univ. Mo.)

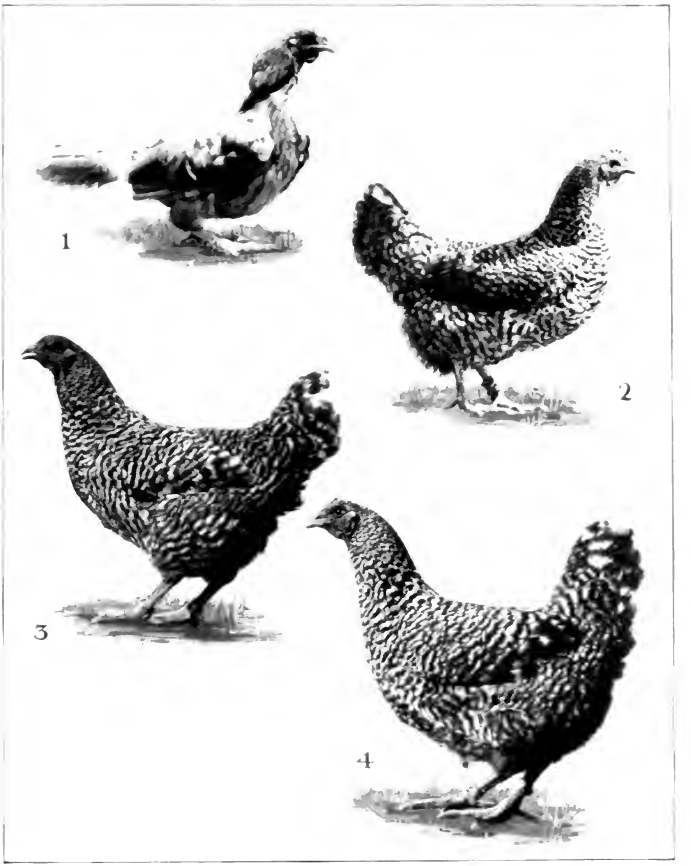


Fig. 1, Kansas 65, a mongrel hen. First year production 100 eggs.

Fig. 2, Kansas 16, a daughter of mongrel hen Kansas 65 and a Barred Plymouth Rock male from a high-laying family. First year production 182 eggs.

Fig. 3, Kansas 616, a daughter of Barred Plymouth Rock grade, Kansas 16, and a Barred Plymouth Rock male from a high-producing family. First year production 208 eggs.

Fig. 4, Kansas 664, a Barred Plymouth Rock grade, daughter of Kansas 616 and a Barred Plymouth Rock male from a trap-nested high-producing family. First year production 248 eggs. (Courtesy Kans. State Agr. Col.)

it is safe to assume that the incubator thermometer is all right. If they disagree, it will be the best plan to invest in a new thermometer. Not infrequently a thermometer which registers perfectly one season may be found to be very inaccurate the following season.

It is the general practice to start the machine at a temperature of about 102° and carry it at that temperature during the first week. The second and third week it is allowed to run as near 103° F. as possible and during the hatch is likely to go to 104° F., which is a good temperature for bringing the chicks out. It should never be allowed to go above 105° F., which is the danger point.

In all localities except where the climate is very humid, it will help the hatches to introduce moisture into the machine. The most convenient way of doing this is to place large shallow galvanized iron trays below the egg trays. These should be filled with sand and the sand kept puddled with water. Where provision is made for the chicks to drop down into the Nursery below, the moisture pans should be removed on the 18th day.

It is customary to turn the eggs at least twice a day until the 18th day and to cool them once. The turning may be done by removing a few eggs from one end of the tray, rolling the eggs in the tray and then replacing those taken out. This turning largely prevents the difficulty known as "stuck germs" which refers to the fact that as the egg loses its moisture, the developing chick occasionally adheres to the shell. A stuck germ seldom, if ever, hatches.

The cooling of the eggs is accomplished by taking the tray out of the machine and placing it on a table or, where the regulator does not interfere, on top of the machine. The eggs should be allowed to cool until

they feel cool though not stone cold, to some sensitive part of the body such as the lips or the eyelid.

It is customary to test the eggs twice during the incubation period, usually about the seventh and fourteenth days, so that the infertile and dead-germ eggs may be removed. The exact time of testing is really immaterial. Some incubator operators prefer to make the test on the 10th and 18th days. The testing should always be done, however, so that the infertile eggs may be made use of by feeding to other chicks or the laying stock and the dead-germ eggs destroyed before they begin to putrefy in the machine.

After the 18th day the incubator should be closed and kept closed until the hatch is well over unless some very unusual circumstance makes it desirable to open it. After the hatch is well over which will be usually the 20th day for Mediterranean breeds and the 21st for the heavier breeds the chicks should be left in the incubator without feeding for at least thirty-six hours.

A very large chick loss by inexperienced poultry raisers would be avoided if they did not make the mistake of feeding the chicks too soon after hatching. At the time the chick breaks its way out of the shell nearly half of the original yolk of the egg is still in the digestive tract undigested. It usually takes at least thirty-six hours for the digestion and absorption of this material. If the chicks are fed before this material fully absorbs it is quite likely to prove fatal owing to its fermentation and putrefaction.

Time of Hatching—March and early April is the time to hatch chicks of the heavier breeds where winter eggs are looked for from the pullets. This means that they must be set in February and March. The eggs of the Mediterranean breeds should be set in March and the first three weeks of April so that they will be out in April and early May. Chicks hatched earlier or later

may do well but the chances are against it. Chicks hatched too early are likely to go into a molt in the fall and not lay till spring. Late hatched pullets are likely not to come into laying until cold weather, in which case they will not probably lay before spring.

Farm Brooders—Two types of brooders which usually meet the farm poultry raisers' needs are the small oil heated Colony Brooder and the large coal heated Colony Brooder. The first usually has a capacity from fifty to seventy-five chicks while the latter will brood from 400 to 600 and even more. It is little more work to attend a coal stove brooder which will care for several hundred chicks than it is a small oil heated brooder. Where chicks are raised in any considerable numbers, it will take very much less labor to take care of them in comparatively large groups than in small flocks, and where they have a good range and fresh ground, they will do nearly, if not quite, as well.

An oil-heated brooder should have lamps with bowls large enough to contain a forty-eight-hour supply of oil. In windy, stormy weather it is sometimes difficult to get the lamp lit and the heater door closed, before the wind puts the lamp out. At such times, it is highly desirable to let the lamp burn another day before opening up the heater box. With the small oil-heated brooders, one should also be very sure that the chicks get a constant supply of fresh air when they are under the hover. Young and old stock both are highly sensitive to the lack of ventilation.

While the larger coal-heated brooders usually do not interfere with proper ventilation, the small hovers with the cover curtains reaching clear to the floor are frequently very defective in this regard. With insufficient ventilation, one can only expect dopy, unthrifty chicks. With the coal-heated brooder, the main thing to look out for is a fire box large enough to carry fire and

keep up the temperature over night. This type of Colony brooder particularly meets the needs of those persons who wish to rear 250 to 300 pullets or to buy perhaps 600 or 700 baby chicks at one time.

A used brooder should be thoroughly disinfected before the chicks are put under it. In any case, the brooder should be heated up until it gives a temperature of about 100° under the hover and run two or three days to make sure that it can maintain that temperature.

It is a good thing to take the chicks from the incubator and put them under the hover, at night, as they seem to become accustomed to the hover and return to it when chilly, more quickly than when they are first put under it in daylight. Some sort of litter should always be scattered under the hover and over the floor surrounding it. The material used when the chicks are first put out should be digestible, such as mealed alfalfa, bran, or the shatterings from alfalfa or clover hay. Not infrequently before the chicks have learned to distinguish between the different kinds of feed, they get to eating the litter. In the case of sand, gravel, chaff or chopped straw, which are all highly indigestible, their crops become impacted and a large death loss results.

With brooder chicks the main effort should be to keep them comfortable. As a general rule it will be found that where a temperature of 100° F. is given at first it can be reduced 4° or 5° a week until the chicks are well feathered out. If the weather is over-warm it may be reduced even faster. If it turns cold, it is frequently necessary to increase the heat again. It is always well to furnish plenty of heat for the chicks, they will move out from under the hover if they are too warm. If on the other hand, they are too cold, they are likely to bunch and pile up resulting in the smothering of some chicks and more or less injury to all. A chick that has been thoroughly chilled probably never regains its full thrift and vitality.

Chapter IV

Rearing Young Chicks

Feeding Chicks—The secret of the successful feeding of little chicks, insofar as there is any secret, lies in four things. The first is in not feeding too soon. The second is to feed sparingly, giving a little at a time and often; the third is to feed only grains which are absolutely free of must or mold, and the fourth is to furnish those ingredients which supply their growing needs.

Chicks should not be removed from the incubator until they show by their actions that they are quite hungry. This is never sooner than thirty-six hours after hatching and is frequently forty-eight or even seventy-two. The reason for this is that when the chicks are fed before all of the yolk material which is taken into the digestive tract just before hatching is fully absorbed and digested, it sours and causes scours, usually followed by a loss of chicks.

It must be remembered that when the little chicks are put in brooders, they are left largely to their own resources. There is no mother hen to keep them alert and interested in picking up their food a bit at a time. The tendency, particularly with the beginner, is usually to overfeed rendering the chicks dull, listless and highly susceptible to the many ills to which they are heir. For the first two weeks after they come from the incubator the chicks should be fed at least five times a day, and never more at one time than they will clean up fairly readily.

The grains used must be sweet. Whenever a new supply is gotten, either by purchase, or from a bin, it should be carefully inspected by burying the nose in a double handful to see whether there is any musty or moldy taint. One may almost as well feed poison to

chicks as to feed grains that have heated or musted in the bin. Much of the so-called white diarrhea found in the Central and Western States is not a contagious disease at all, but a condition caused by one of two things: feeding too soon after the chicks are hatched or feeding grain that is not perfectly sweet.

In furnishing the chicks with the proper ingredients for growth, it has been found that sour milk when used in connection with the grains usually available in most sections of the country, comes as near being what the chick needs as anything that can be found. This is emphasized in the following outline taken from Bulletin No. 96 of the Storrs Agricultural Experiment Station:

Sour Milk the First Feed—"On removing from the incubator take each chick individually and dip its beak in sour milk in order to make sure that milk is the first food taken into its system. Be sure that the chick swallows two or three times before passing it on to the box or basket in which it is to be carried to the brooder. Extensive experiments have shown that milk is a quickly and easily digested food and that it has a most favorable influence in promoting growth and in reducing mortality from all causes. It has been the practice at this station not to give the chicks any water to drink until they are eight or ten weeks old, provided they are given all the milk they will consume. This method insures the consumption of milk by all the chicks whereas, if both water and milk are available, some of the chicks are likely to drink only water. For best results sour milk should be fed in a thickened condition but before the curd has separated from the whey. The chicks seem to like it best in this condition and will consume more than if it is not yet thickened or if separation has taken place.

"Practical considerations may prevent feeding the milk in this ideal condition. In the first place thick

milk does not readily feed down in a drinking fountain and fountains are often preferred to open drinking pans. Furthermore, it may not always be possible to get milk in just the same condition every day so that uniform souring can be allowed to take place before feeding. In avoiding these difficulties it is better to feed the milk before it has thickened than to wait until it has separated. Chicks apparently do not relish the clear whey which always remains at the top, but if one follows the natural inclination to pour it off, a lot of valuable food will be lost.

"In many cases, especially where milk is produced on the farm, it may be more desirable to feed sweet milk than to wait for it to sour. In deciding this, as with many other problems, the poultryman must be governed by his own particular conditions. In all our experiments we have obtained substantially equal results with sweet and sour milk. The only reason for advocating sour milk is that the chicks seem to prefer it. The lactic acid in sour milk is not at all a necessary factor in milk feeding.

"Part of the beneficial effect of the milk seems to come from the fact that it induces the chicks to consume larger quantities of grain and mash than will chicks of the same age when not given milk. For this reason, if for no other, a supply of milk should be kept constantly available from the time the chicks are placed in the brooder and for just as long as it can be obtained at a reasonable price.

Feeding Practice—"The first day's rations should consist of fine chick feed in which has been mixed a large percentage of fine grit. It may even be well to give clear grit for the first feed. If coarse sand is used on the floor it will take the place of commercial grit. The chicks will learn to eat grit just as readily as they will pick up grain. Under no circumstances should the

early feeding of grit be omitted for without it the chick cannot make use of the hard food which it is to be given. After two or three days the proportion of grit may be reduced and after the first week it may be hopper fed if desired, in order to prevent waste.

"As soon as the chicks learn to eat the grain it should be scattered in a litter where they will have to work for all they get. Feed them sparingly four or five times daily and make them exercise. It is very easy to overfeed young chicks. They should be kept always hungry for more. Let the digestive organs gradually work up to their maximum capacity during the first two or three weeks, after which time the chicks may safely be fed all they will consume.

"Beginning with the third day wheat bran should be constantly available. Bran is a mild laxative and in this connection probably has some value. More important, however, is the fact that it is bulky. The consumption of bran insures a considerable distension of the digestive tract, putting it in shape for the work that it will soon be compelled to do. Bran satisfies the chick's craving for something to eat without calling upon the digestive system to assimilate a lot of nutrients which it is not yet prepared to handle. Another important point to remember is that bran is rich in mineral matter except lime. In particular it contains a large amount of phosphorus and this is very important for the formation of bone. The building of bone also requires lime in some form. This may be furnished by using grit that contains a considerable amount of lime or by feeding fine ground oyster shells in hoppers where the chicks can get them as desired.

"During the second week feed the grain three or four times daily and substitute chick mash for the wheat bran. When the chicks are about six weeks old, the chick feed may gradually be replaced by inter-

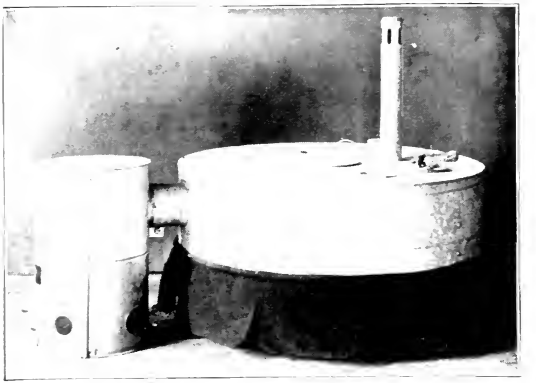


Fig. 1. Oil lamp heated small sized hover.

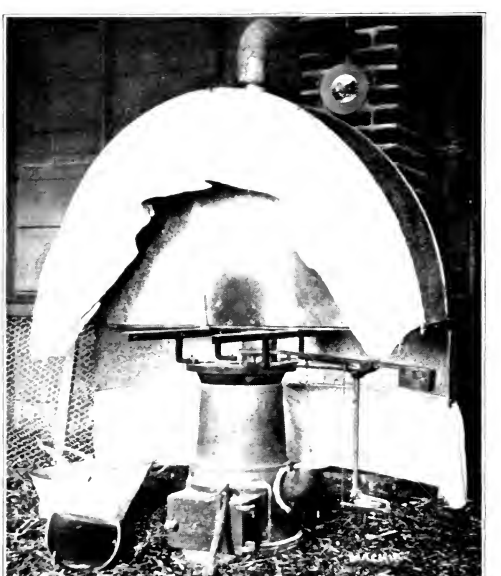
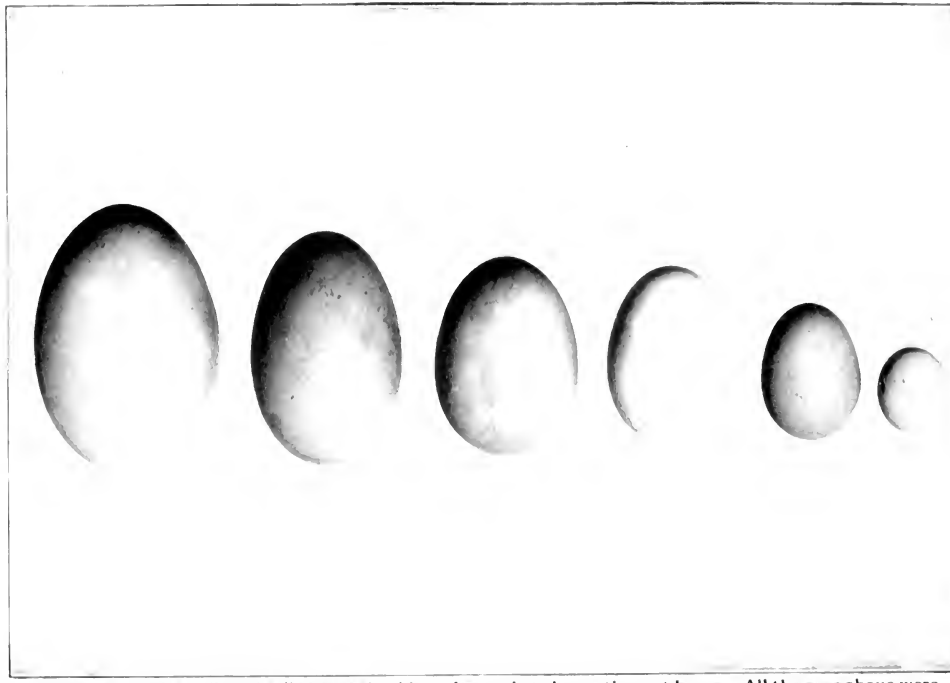


Fig. 2. A coal stove brooder, hover raised. This type seems to be displacing the smaller oil heated hover. (Courtesy Kans. State Agr. Col.)



Extremely large, small, and soiled eggs should not be marketed; use them at home. All the eggs above were produced by a farm flock of mixed or mongrel fowls. (Courtesy U. S. Department of Agriculture.)

mediate or scratch feed and the number of feedings reduced to three daily. Also the chick mash may be replaced by the regular laying mash.

"Make all changes of feed gradually. If changed suddenly from all chick feed to all scratch feed, the chicks will probably eat very little of the new feed and in consequence will receive an undesirable set-back in growth."

The feeding formulas which have been used by the Storrs Agricultural Experiment Station for several years are as follows:

CHICK FEED

Cracked Wheat	15 lbs.
Fine Cracked Corn	15 lbs.
Pinhead Oats	10 lbs.
Broken Rice	3 lbs.
Fine Charcoal	2 lbs.

DRY MASH

Wheat Bran	20 lbs.
Corn Meal	10 lbs.
Sifted Ground Oats	10 lbs.
Low Grade Flour	10 lbs.
Beef or Fish Scrap	10 lbs.

At six weeks of age the chick feed was gradually replaced by scratch feed and the chick mash by the regular laying mash. The formula for each of these is given:

SCRATCH FEED

Cracked Corn	200 lbs.
Wheat	200 lbs.

LAYING MASH

Corn Meal	100 lbs.
Wheat Bran	100 lbs.
Ground Oats	100 lbs.
Flour Middlings	100 lbs.
Beef or Fish Scrap	100 lbs.

Green Feed—For the best growth and development of chicks another factor is also necessary, namely,

green feed in some form. This may consist of mangels, table beets, sprouted oats, lettuce, lawn clippings, or other things which are available at different seasons. The supplying of green feed should begin early—chicks will eat it as soon as the third or fourth day. If mangels are used they should be cut fine and scattered a little at a time where all the chicks may have a chance to get a taste. As soon as they learn to eat them well the mangels may be sliced and hung on finish nails on the wall. The chicks cannot get too much green feed and they should have access to a bountiful supply at all times.

Separate the Sexes—As soon as the sexes can be distinguished they should be separated. Unless the cockerels are to be sold as breeders, they should be penned up and heavily fed until they are large enough to be disposed of as broilers weighing 1½ to 2½ pounds. They will never come nearer to returning a profit than at the broiler age. In some sections where good prices for capons prevail it may pay to caponize the cockerels and grow them out for the holiday market. In most cases, however, the room can be used to better advantage in developing pullets.

Location of Poultry House—When the chicks are well feathered out and all danger of their needing further heat is past, they should be given quarters supplied with perches so located that they can have abundant range. Whether it is to be used for old or young stock, the poultry house should be located where the drainage is good and there is an abundance of shade near by. Although the chicken originally came from a very hot country, it was a jungle-dwelling fowl unable to survive the burning sun without the protection of trees and shrubs. Its need of this kind of protection has not changed and the poultry house should be very close to the orchard or woodlot. If the chicken

house is to be dry, as it must be to give good results, it must be located where the drainage is good either naturally or because of tiling.

Essentials of Good Hen House—There are four essentials of a good chicken house. When these are taken care of, it makes little difference what style or type the house is. These four essentials are dryness, ventilation without drafts, sunlight and plenty of room.

The domestic fowl is very much more dependent upon its breathing apparatus to regulate the body temperature through evaporation than other farm animals. It also depends upon its lungs and air sacs, to a large extent, to get rid of the excess moisture of the body. Whenever a chicken is forced to breath damp air, it is at a physical disadvantage and it is uncomfortable. It is only the comfortable chick that will thrive and the comfortable hen that will lay many eggs.

One of the means of keeping a hen house dry is to furnish plenty of ventilation. Chickens, however, are sensitive to drafts and take cold easily, hence this ventilation should be furnished in such a way that the birds are never in a direct draft. Pound for pound, fowls use a very great deal more oxygen from the air than do horses, cattle, sheep and swine. An insufficient supply of fresh air is more quickly injurious to them than to any other class of farm animals.

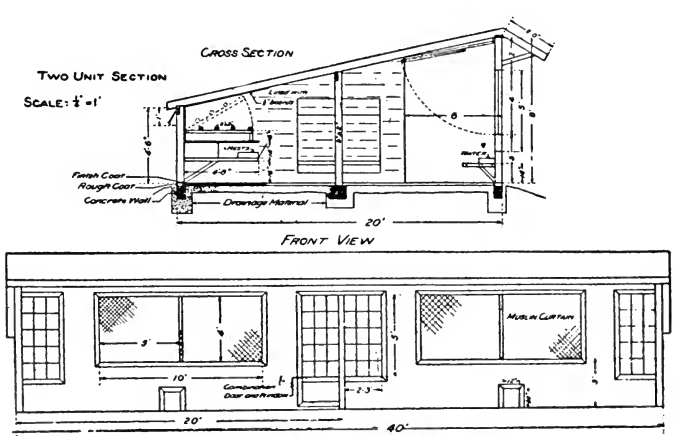
Plenty of sun shining into the house is also an aid in keeping it dry. Sunlight also makes the house more cheerful and attractive and the hens more comfortable. It is further the best natural disinfectant that we have and is a great preventive of disease. A common fault of farm hen houses is that they are too dark.

The chicken house may be dry, well ventilated without drafts and have window space sufficient to admit plenty of sunlight and still give bad results if too many individuals are crowded into a given house.

For the older birds the best results will usually be secured if from *3½ to 4 square feet of floor space per bird* is allowed.

As a usual thing, the net returns from a flock of 100 laying hens kept in a house 20x20 will be greater than from 200 hens kept in the same house taken year in and year out. In years when the windows are open and the birds can be out of doors most of the time, the results from the crowded house might not be so bad, but in ordinary years, the winter egg production, which is the most profitable production, would be very seriously interfered with.

Plans of a very successful laying house, taken from the New Jersey Agricultural Experiment Station Bulletin 325, are shown in Figures 1 and 2, which give the arrangement of perches, nests, watering devices and feed hoppers. In all those sections where it is not unusually dry, it would be advisable to put in a layer of coarse crushed rock below the cement floor in

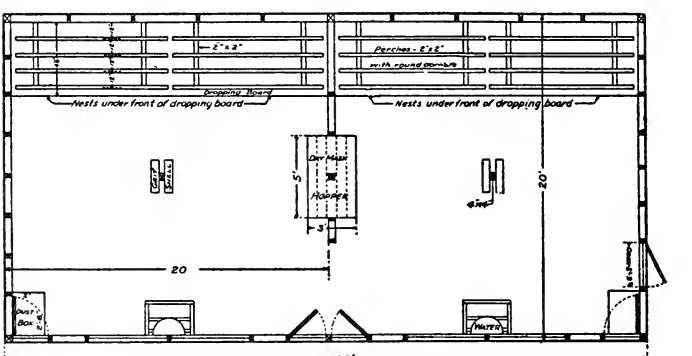


NEW JERSEY MULTIPLE UNIT LAYING HOUSE

Fig. 1

order to keep out the moisture that is constantly working up through the ground and, unless prevented, through the floor into the hen house. Proper construction of the floor of the hen house is one of the most important items.

Attention is also called to the ventilator at the rear of the house behind the dropping boards which allows for a summer ventilation. The space immediately behind and above the dropping boards is fixed so that the draft cannot strike the birds when at roost but will pass above or below them.



NEW JERSEY MULTIPLE UNIT LAYING HOUSE
FLOOR PLAN – TWO UNIT SECTION
SCALE $\frac{1}{8}$" = 1'

Fig. 2.—Floor plan of an excellent poultry house. (Courtesy N. J. Agr. Expt. Sta.)

Care of the House—Good results from the flock depend to a marked degree upon the care of the building that houses them. The house that is not cleaned and thoroughly sprayed at intervals is almost sure to harbor mites and lice and to be filthy as well. Filth provides a great place, not only for the breeding of mites, but for the development of disease germs.

The chicken house should be thoroughly cleaned out and the floor, walls, ceiling and fixtures thoroughly drenched with some powerful disinfectant at least twice a year, preferably the early spring and in the fall. A three percent solution of a coal tar stock dip will serve. The litter kept in the house should be removed and replaced with fresh whenever it becomes so broken up that grain thrown out to the birds does not disappear so that the birds have to scratch it out to find it.

In commercial poultry plants where fowls are kept in quite large numbers, the artificial lighting of the houses, morning and evening, proves profitable during the winter. Giving hens 12 hours of light increases egg production at the season when prices are high. It apparently does not increase the yearly production. For ordinary farm flocks, however, it would hardly pay.

Yards—Fowls should be fenced out of places where they are not wanted rather than into yards. Free range is the ideal chicken yard, for it usually furnishes cheap feed and good health. Hence, the practice of fencing chickens out of the door yard and garden and away from the granary and giving them the run of the farm is growing. Where it is necessary to confine the birds, the larger the yards can be made the better. Whenever they are so small that the chickens keep them bare of greenness, the flock is in danger of a bad epidemic of disease. Such yards should be turned over at least once a year (twice a year is better), and seeded down to some quick growing crop. Only by such means can the soil be kept free from disease.

It is highly important that the pullets be put into the laying house early. They should be in winter quarters long before they begin to lay. When they are neglected and are not moved into the permanent laying house until after they begin to lay, they are very likely to be thrown into a molt which will in turn seriously interfere with their winter egg production.

Chapter V

Poultry Feeding

Feeding Laying Hens—Contrary to the general belief, there is no one ration which is better than all the rest and which is a guarantee of egg production. As much depends upon how a ration is fed as upon what the ration contains. The following ration taken from the Purdue University Agricultural Experiment Station Bulletin No. 218 has been widely used and has given most excellent results. It has the very great advantage of being quite simple.

GRAIN

Corn	10 lbs.
Wheat	10 lbs.
Oats	5 lbs.

MASH

Bran	5 lbs.
Shorts	5 lbs.
Meat Scraps	3.5 lbs.

Where there is plenty of skim milk available, it may be used to replace the meat scrap, if given as a drink. The following routine in feeding laying hens taken from Lippincott's Poultry Production has proved successful in a large number of cases.

"In the morning give a light feed of grain, soon after the birds leave the perch. This should be scattered in a deep litter of straw to every part of the pen so that the birds will be compelled to scratch vigorously for some hours in order to search it all out. Fresh water should be supplied in the morning.

"At noon as much succulence as the birds will clean up in twenty minutes to half an hour should be supplied. Fresh water should be given and the dry mash hopper opened.

"Two to three hours before the birds go to roost they should be given a full feed of grain thrown in the litter. It is essential to the best results that the birds go to roost with full crops, and this feeding should not be stinted. An examination of the crops of the birds should now and then be made after they are on the perch to ascertain whether they are well filled.

"It is better to overdo the matter of evening feeding a little than to slight it. If a little grain is left in the litter, it will be eagerly scratched out in the morning. Great care should be taken, however, so to feed that the straw is scratched absolutely free of grain at least once a day. In following this particular routine this should be the condition at noon. The really skilled feeder is the one who so handles the ration that he constantly piques the appetite of his fowls, making them consume large amounts of feed with relish, yet never giving quite all they would like to consume. As noted in other connections, of the two evils, 'overfeeding' or 'underfeeding' to a slight degree, the latter is preferable. It limits production slightly, by not furnishing quite all the raw material that could be made over into a finished product, but it keeps the appetite keen and the body in good working order. Overfeeding, on the other hand, cloys the appetite and clogs the system, thereby limiting production even more than in the first case.

"Unless the weather is quite cool, fresh water should be supplied at the time of the evening feeding. In the event of freezing weather, the water pan should be emptied."

In the Purdue University Agricultural Experiment Station ration given above it is assumed that the hens will consume 25 pounds of the grain while eating 13½ pounds of the dry mash where meat scrap is used. Where meat scrap is not used, they will consume 25

pounds of grain to 10 pounds of dry mash and drink 50 to 60 pounds of skim milk.

Another ration originating at the Cornell Station and fed with excellent success is as follows:

GRAIN

Wheat	3 parts
Corn or Kafir	2 parts
Oats	1 part

DRY MASH

Corn Meal	60 lbs.
Wheat Middlings or Shorts	60 lbs.
Meat Scrap	50 lbs.
Wheat Bran	30 lbs.
Linseed Oil Meal	10 lbs.
Alfalfa Meal	10 lbs.
Salt	1 lbs.

This ration may also be fed according to the routine outlined above.

Fattening for Slaughter—While the final finishing for slaughter is done in the feed lot in the case of most of the farm animals, this does not hold true for poultry. Instead it is done at the packing house by means of milk feeding in crates, because birds that are properly fattened on the farm are so tender that they cannot stand the handling necessary for shipment without bruising. These bruises develop into highly colored green and blue patches that spoil the appearance of the carcass and interfere with its sale. The fattening process also has a peculiar effect on the bones, rendering them so chalky and brittle that it is almost impossible to ship finished stock without breaking legs and wings.

While the final finishing must be done at the packing house, it pays to send the birds to market in good flesh. In the case of mature birds, it is a good plan to pen them up and feed all the corn they will eat for a period of two weeks prior to sale or shipment.

Chapter VI

Poultry Diseases

The Disease Problem—In dealing with poultry diseases, preventive rather than curative measures should be depended upon. The flock that is well bred from the standpoint of vigor, is reasonably well fed and given a comfortable house and run on land that is sodded or grows a crop each year, is not likely to give much difficulty from diseases. As a usual thing it will be found easiest and the least expensive to isolate individual ailing birds and except in the case of slight ailments which quickly recover, kill and burn them. Where one is so unfortunate as to have an epidemic make its appearance, the veterinarian should be called or fowls that are just coming down with the disease should be shipped to the State Experiment Station for examination and diagnosis.

Lice and Mites—In the control of lice sodium fluorid is nearly 100 per cent efficient. It is easily the best louse killer to be obtained. It can usually be secured from the local drug store and comes in the form of a white powder. It may be applied in two forms, as a dust or as a dip. Where applied as a dust, small pinches of it should be worked into the feathers on the head, neck, back, breast, under the wings and below the vent. During the warm weather it is very much quicker and much more effective to dip the fowls. The solution is colorless and does not stain the feathers. Where the dipping is done on a warm, quiet, sunny day the birds dry out quickly and no ill effects follow.

The following is quoted from Farmers' Bulletin 801 of the U. S. Department of Agriculture:

"In using the dipping method all that is necessary is a supply of tepid water and a tub. If two persons

are to dip at the same time it is advisable to use a large tub. The water should be measured into the tub and three-fourths to one ounce of commercial or two-thirds of an ounce of chemically pure sodium fluorid added to each gallon of water. It is readily dissolved by stirring. The tub should be filled to within 6 or 8 inches of the top, and as the amount of solution is lowered through dipping numbers of fowls, water with the proper proportion of sodium fluorid dissolved should be added from time to time.

"In dipping the fowls it is best to hold the wings over the back with the left hand and quickly submerge the fowl in the solution, leaving the head out while the feathers are thoroughly ruffled with the other hand so as to allow the solution to penetrate to the skin on different parts of the bird. The head is then ducked once or twice, the bird is lifted out of the bath and allowed to drain a few seconds and is then released.

"It is not necessary to keep the fowl under the water longer than 20 to 30 seconds and the head only an instant."

Mites can be controlled by spraying thoroughly the interior of the hen house and all the fixtures with a mixture of kerosene and crude oil in the proportion of 1 to 3. As a usual thing, one thorough application will completely eradicate the mites of the infested house but to make sure, it is advisable to make a second spraying a month after the first.

Chapter VII

Turkeys

Standards—Of the six varieties of turkeys recognized in America the Bronze is by far the most widely bred. It is also the largest and is usually the most desirable for market purposes in spite of its dark feathers. The standard weight of the young tom is 25 pounds, yearling, 33 pounds and adult 36 pounds. The standard weight of the young female is 16 pounds and the mature female 20 pounds. Next in popularity comes the variety known as the White Holland, which is a somewhat smaller bird. The standard weights for the males of different ages is 20, 24 and 28 pounds and for the females 14 and 18 pounds.

Management—It is unnecessary to provide a house for turkeys though it is the part of wisdom to have a shed handy into which they may be driven on extremely stormy nights. As a usual thing they will do better roosting out in the open even in quite severe weather. Where only a small flock is kept 15 females may be mated with one male if he is unquestionably vigorous. If a flock of about 25 or 30 is kept, two males will be needed but they should not be allowed to run with the flock at one time. One should be allowed to run with the flock one day and the other the next. The reason for this is that where both are allowed to mingle with the flock at the same time, they will fight until one of them becomes boss, after which he will do most of the mating and the flock will be very little better off so far as the fertility is concerned than if it had a single male.

When one experiences difficulty with having the laying hens hide out their nests during the hatching season, this can usually be overcome by shutting the

birds in a pasture or better still, the orchard, until they are through laying, when they may be let out for exercise. They may be driven in at night-fall if there are suitable roosting quarters, or allowed to roost out all night and driven in in the morning. The latter is not difficult to do where one has been following the practice of giving a morning feed.

During the winter the birds should be fed twice a day on equal part of oats, wheat and corn. Something in the line of green feed should be given and also feed of animal origin such as meat scrap, high grade tankage or sour milk.

Raising Poults—As a usual thing it is the best plan to raise the poults with their natural mothers or with chicken hens. Turkey hens are the most satisfactory mothers for poults but where it is desirable to break up the broody turkey hens and get them to laying again, chicken hens may be used. Turkey hens will ordinarily cover fifteen to seventeen eggs while chicken hens of the middle weight breeds will take care of seven to nine. Whether turkey or chicken hens are used the nests should be made on the ground and lined with straw. The setting hen should always be carefully dusted with sodium fluorid so that she will certainly be louse free at the time of bringing off the hatch.

Handling Young Poults—For brooding young poults plenty of exercise and dryness are the two great essentials. The coop used for the mother hen should be weather tight, though allowing for ventilation. It should also be movable so that it can be shifted about from place to place. Where the poults are on range they will usually need little, if any, feeding. When the conditions are such that they cannot be out on the range some attention must be given to their feeding. The following is a method outlined in Farmers' Bul-

letin No. 791 of the United States Department of Agriculture, "For the first two days after hatching, poults require no feed, the yolk of the egg which they absorb before breaking out of the shell being sufficient to maintain them for that length of time. Access to clean drinking water and a little coarse sand and green feed to pick at, is all that is needed until the third day. Beginning with the third day, the poults should be fed according to the quantity of natural feed they are able to pick up outside the coop. They should always be hungry. To feed all they will clean up several times a day removes the cause of searching for food, so little exercise is taken and indigestion is sure to result. When natural feed is scarce, or when the poults have to be kept from ranging outside, they should be fed lightly about five times a day. If allowed to run outside the coop where they can find insects, seeds, and green feed, they need not be fed oftener than two or three times a day.

Successful turkey raisers use many different kinds of feed, some of the most common being as follows:

1. Hard-boiled egg chopped fine and corn-bread crumbs for the first week, and then whole wheat and hulled oats.
2. Stale bread, soaked in milk and squeezed dry, for the first few days and then common chick feed.
3. Clabbered milk seasoned with salt and pepper, corn-bread crumbs.
4. Equal parts "pinhead" oats, whole wheat, and cracked corn.
5. Cracked wheat.
6. Corn meal and wheat bran mixed in the proportion of three to one and baked into bread.
7. Bran or middlings one-half, cracked Egyptian corn one-quarter, wheat and hulled oats one-quarter.

In addition to the above, skim milk and buttermilk are quite often fed, with excellent results. A good plan

is to keep the milk in front of the poults during the morning and water during the afternoon. If grit and green feed cannot be picked up outside the coop, they must be provided in some other way. Chopped onion tops, lettuce leaves, dandelion leaves and alfalfa make excellent green feed. Grit can be furnished in the form of coarse sand.

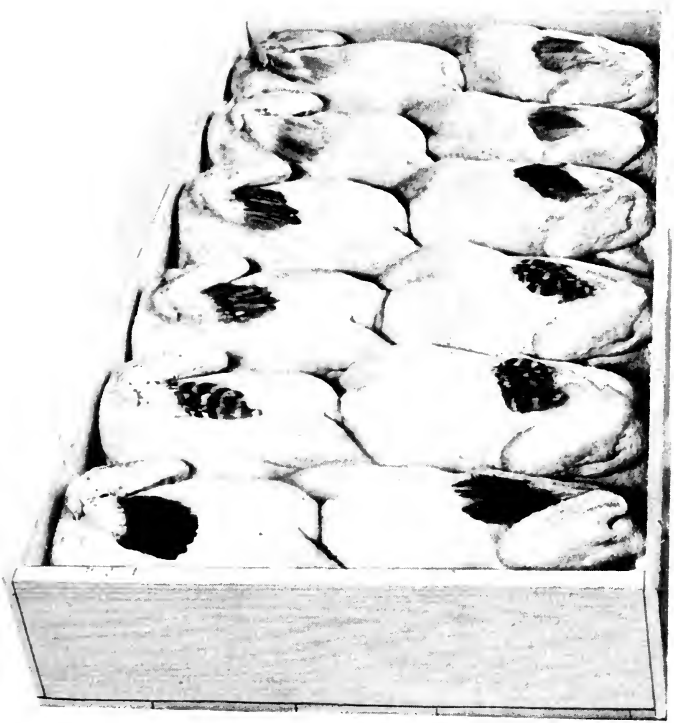
Feeding for Market—In getting the turkeys ready for market it is a good thing to begin feeding a little night and morning about the middle of September. The feed should be very light at first and the amount gradually increased until about ten days before marketing when they should be given all they will consume three times a day. In the beginning equal parts of wheat, oats and corn may be given but the proportion of corn should be gradually increased until the last of October when they should be fed on corn alone. As a usual thing results are not satisfactory where the birds are confined during the fattening period.

Chapter VIII

Ducks

Management—Ducks like turkeys are looked upon as meat producing birds. While the Runner duck is quite well known for its laying propensities, it is the only one of the several varieties that can be looked upon as an egg producer. Among the meat breeds the Pekin stands pre-eminent. Where these birds are given proper attention they may be marketed at ten to twelve weeks weighing five to six pounds. They can be raised with success on general farms but the duck business has tended very rapidly to be concentrated on intensive duck farms of large size. A house similar to the one required for chickens is desired. The essential of the duck house is that it shall be dry and have fresh air with freedom from drafts. The floor of the house should be kept well bedded with straw and cleaned out as soon as the straw becomes matted and damp. Dry feet while in the house at night seems to be a necessity for egg production. Ducks make their nests on the floor of the house by burrowing the straw. The number of ducks per house should be one for every 6 feet of floor space for breeders, though fattening and young ducks may be kept closer. A mesh fence 18 inches high will hold most ducks and a 2-foot one all of those commonly raised as most of them cannot fly.

Breeding—At the beginning of the breeding season one drake should be allowed for five or six ducks. The number of males should be reduced to one for every seven about March 1st and then one for every nine or ten about April 1st. The number of drakes should always be decreased when they begin to worry the ducks.



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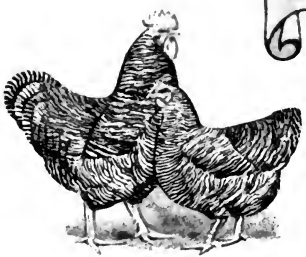
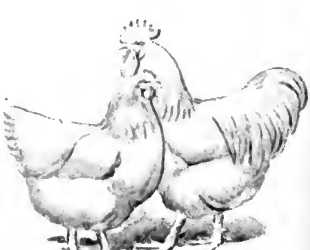
Standard B



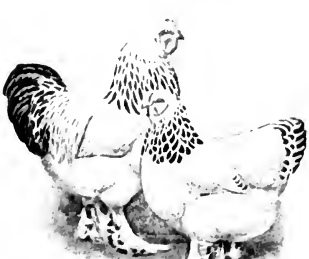
BARRED ROCK

WHITE ROCK

EMBDEN GEESE

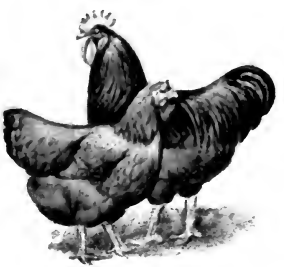


BUFF ORPINGTON

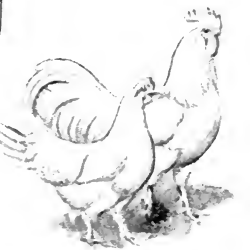


LIGHT BRAHMA

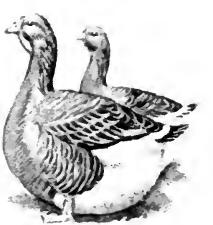
ds of Poultry



RHODE ISLAND RED



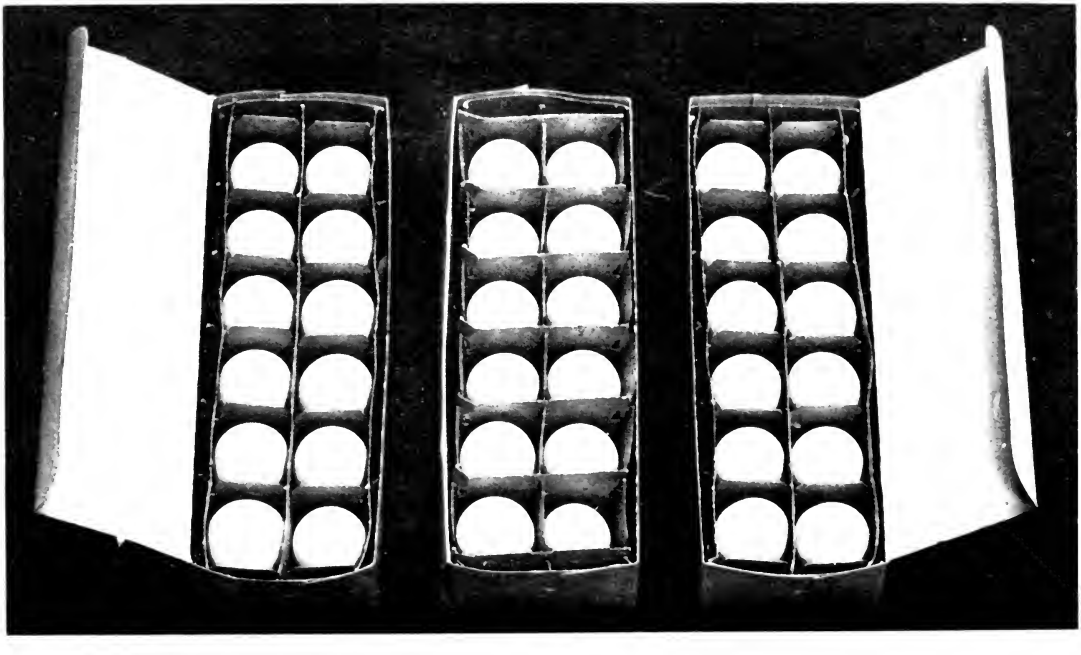
WHITE LEGHORN



TOULOUSE GEESE

BRONZE TURKEY

WHITE WYANDOTTE



Uniform Products Command the Best Prices.
Standard Bred Fowls Produce Uniform Products.
(Courtesy U. S. Department of Agriculture)

The desire to incubate their own eggs has been bred out of many strains of ducks, particularly the Pekin. For this reason the egg must be hatched in incubators or under hens. Duck eggs should be gathered daily, kept in a cool place and turned daily. They should be set as soon as possible after laying as they do not keep as well as hens' eggs. In incubating duck eggs artificially, they are handled about the same as hens' eggs except that the temperature should be held at 102° for the first three weeks and more moisture supplied in the machine. They may be tested for fertility on the fourth or fifth day. Ducks take very kindly to artificial brooding and are in fact usually easier to handle than chicks. The incubation period is twenty-eight to thirty days for all varieties except the Muscovy, in which case it is thirty-five days.

Raising Young Ducks—Where they are to be sold as green ducks at ten to twelve weeks, the young ducks are usually not allowed to range but are fed heavily from the first. The brooder temperature should be about 95° to start with but is reduced more rapidly than for chicks, usually being brought down 10° the first week and reduced even more rapidly thereafter. Ducklings should not be fed for at least thirty-six hours after hatching. The ration for the first week may consist of equal parts of bran, corn meal and middlings with 5 percent of sand in it to serve as grit. This should be given to them five times daily, care being taken that no more is fed than will be completely cleaned up. After the third day 5 percent of sifted meat scrap should be added and green feed in the form of chopped lettuce, alfalfa or clover fed freely. After the first week the number of feedings may be reduced to four and the ration, two parts wheat bran, one part wheat middlings, one part corn meal and one-half part meat scrap with 5 percent sharp sand, may be given.

In addition all the green food they will consume should be furnished. At about eight weeks of age the young ducks should be confined in a cool, shady place and fed for three weeks on a fattening ration which may consist of equal parts of wheat, bran, middlings, corn meal, to which is added 10 percent of meat scrap and 5 percent of sharp sand and all of the green feed they will consume. Birds saved for breeding should not be pushed for growth but they should be kept in a shady, grassy pasture and light feeding of two parts wheat bran, one part corn meal and one part ground oats may be given twice a day. With all ducks, young and old, fresh water should be kept before them at all times and the drinking dishes should be deep enough so that the nostrils may be cleansed. Along about the first of November these birds should be given access to a mash consisting of two parts wheat bran, one part middlings, one part corn meal and one part meat scrap. This ration should be continued throughout the breeding season.

Chapter IX

Geese

Varieties—The Toulouse and Embden geese are by far the most popular breeds for farm raising. The Toulouse, which is gray in color, is the larger of the two, the young gander weighing 20 pounds and the young goose 16 pounds. The adult gander weighs 26 pounds and the adult goose 20 pounds. The Embdens are white geese weighing 18 and 16 pounds for the young gander and goose respectively while the adult male and female weigh 20 and 18 pounds, if up to standard weight.

Feeding and Management—Except in the most extreme weather no shelter is necessary for geese. When some protection is necessary usually a shed intended primarily for some other purpose will be available. Geese should not be used for breeding purposes until they are coming two years old though the ganders may be used the first season and for several seasons thereafter. For best results not more than two geese should be mated to one gander. While goose eggs may be artificially hatched and brooded, it is usually found more satisfactory to hatch them under hens. Hens used for hatching eggs should be carefully dusted with sodium fluorid and given good care during the hatching period as this lasts from 28 to 30 days. Whether eggs are put in incubators or under hens they should be sprinkled with warm water every day during the first week. The first goslings should not be hatched until the grass is green. When they are about due to hatch if hens are used the eggs should be carefully watched and the first goslings taken out as soon as they hatch and wrapped in a woolen cloth and kept in a warm place. They should be kept away from the nest

until the youngest goslings are several hours old, when they may be given back to the hen. If this is not done the hen is likely to become restless and leave the nest with the older goslings before the late ones are strong enough. They should be closely confined with their mother until they are three or four days old, after which they may be allowed liberty with their mother in a grassy pasture.

Goslings should be fed carefully for the first week or ten days after which they secure most of their food if allowed to run in a good pasture. The rations fed by different raisers are numerous but all agree in feeding only a mash. This may consist of corn meal to which is added 10 per cent of meat scrap, or five parts corn meal, five parts shorts and one part meat scrap. Either of these rations should be moistened to a crumbling consistency with milk or water. As a usual thing mature geese will be self-maintaining if kept on a good pasture. In case of drought or during the winter, however, they should be fed such bulky feed as mangels. turnips or steamed clover supplemented by the mash of equal parts corn meal, bran and ground oats. For both young and old stock there ought always to be an abundance of drinking water handy to the place of feed. Ground bone or charcoal should always be available. Geese intended for breeding purposes usually do better on pasture than in the feeding lot with other stock, as in the latter case they are likely to get too fat.

Chapter X

The Poultry Industry

Geographical Distribution of Poultry Production—The great egg and poultry producing territories of the United States can be divided according to their geographical location and the character of the industry, into three quite distinct sections. The first of these comprises the northeastern states, including New England, New York, Pennsylvania, New Jersey and Maryland. This is a section in which the poultry industry is one of importance and where many large and specialized poultry farms are located. Inasmuch as it also happens to be one of the greatest consuming sections of poultry products, the local supply does not meet the demand, and large quantities are brought in from other parts of the country.

The second producing section comprises the states bordering on the Pacific. Here the conditions are in many respects identical with those of the first section, though production has outrun consumption and a considerable surplus is now marketed in the east.

The third section comprises principally states lying in the Mississippi Valley. They are Minnesota, Wisconsin, Illinois, Michigan, Indiana, Ohio, Nebraska, Iowa, Kansas, Missouri, Kentucky, Tennessee, Oklahoma, Arkansas and Texas. In this great section the vast majority of the eggs are produced; yet the character of the poultry keeping is quite different from that in the other two sections discussed. There are in this whole stretch of country few farms which can properly be termed poultry farms or where poultry raising can properly be considered one of the main branches of the farm work.

Present Organization of Poultry Industry—The poultry industry as a whole is a combination of several more or less clearly defined co-ordinate industries which have to do with growing and marketing poultry and poultry products. Classifying them according to the particular industries in which they are engaged, the persons associated with the poultry industry may be designated as (1) production breeders; (2) fanciers and fancier breeders; (3) producers; (4) custom hatchers and baby chick dealers; (5) buyers; (6) packers and (7) distributors.

Between these groups there are no hard and fast lines and the same person frequently engages in more than one line of work. Thus the producer of the best type carries on breeding operations within certain limits, the production breeder should be somewhat of a fancier and the packer is usually a buyer and may be a distributor as well.

The Production-Breeder—A breeder is one who seeks to improve stock through proper selection and mating. From the standpoint of poultry production, improvement refers to an increased efficiency in the production of human food. A breeder whose primary aim is to raise the food-manufacturing efficiency of any species of poultry may for convenience be called a "production breeder." A comparatively small, but constantly growing number of breeders are turning their attention toward production. Their principal function with regard to production is to furnish the producer with breeding males of standard varieties with which to improve his flocks whether the flocks are mongrel or purebred. Pedigree breeding, the only method by which prepotent males able to sire efficient producers can be produced with any regularity, is out of reach of the producer who must make his profit by securing a narrow margin on many birds, rather than

a wide one on a few. The true breeder, however, is a producer in the very best and highest sense. For the producer can follow only as far as the breeder leads the way.

Fanciers and Fancier-Breeders—The term "fancier" refers to a person who breeds poultry as an art rather than for the production of food, while a "fancier-breeder" is one who breeds poultry for fanciers. At the present time the fancier-breeders as far outnumber the production-breeders as the fanciers are outnumbered by producers.

The preponderance of fancier-breeders over production-breeders is largely due to three causes. The first is the elaborate poultry show system in vogue in this country, the second is the lack of anything like the general adoption of a merit system in the purchase of farm poultry products, and the third is a profound ignorance of the laws of productive breeding.

The Producer—A "producer" is a person who raises poultry primarily for human consumption. While there is at present an undoubted tendency for the production of poultry and eggs for food to be made a specialty, well over ninety percent of the poultry products marketed in the United States are produced on general farms where poultry raising is one phase of a diversified agriculture.

In the extreme eastern and western states, and in the vicinity of certain of the large cities of the central states there are sections containing numerous small farms given over to the production of eggs and poultry for special trades. Possibly most famous of these is the Petaluma district of California which specializes in white eggs and markets its surplus on the New York market, which demands a white egg. The Vineland district in New Jersey furnishes new-laid white eggs for the fancy trade in New York. The Little Compton

district of Rhode Island produces brown eggs for the New England markets.

Specialized, intensive, small poultry farms bear a somewhat similar relation to general poultry production that the greenhouse culture of vegetables does to general market gardening. They are useful for the production of out-of-season luxuries for the wealthy, but have little to do with feeding the nation. And in common with the production of luxuries generally, though large and tempting profits are sometimes made, they are hazardous as an exclusive occupation.

The general farm producer usually disposes of his products as staples and his problem, since he sells at the current quotation, is to reduce the cost of production. Where the poultry or eggs are handled as specialties, the great problem is marketing, of getting a special or fancy price for each individual unit of the product.

The Custom Hatcher and Baby Chick Dealer—A present tendency in poultry production is for the producer to depend upon a skilled hatcher to furnish him with living chicks. This practice though ages old in Egypt and China, is a comparatively recent development in America. Though assuming large proportions, the baby chick industry is yet in its infancy in this country and an expansion hardly yet dreamed of is the prospect of the next few years. It is not improbable that the hatching of chicks for the surrounding territory may ultimately become as centralized a function as fattening and finishing already have.

The term "custom hatcher" refers to a person who incubates, for a consideration, eggs which he does not own, usually for nearby producers. Good sized centralized hatching plants are appearing in most communities where poultry forms an important item among

the agricultural products. This takes the bother of hatching and the necessity of purchasing an incubator away from the farm, yet allows the producer to develop his own line of stock.

The baby chick dealer is one who owns the eggs he incubates and sells the chicks. The latter are frequently hatched by the thousand and may be shipped hundreds of miles to customers. At the present time over two-thirds of the baby chicks sold go to city or town customers.

The Buyer—In nearly every trading point in the United States there is someone who is willing to buy eggs and poultry from the producer at any season of the year. At the smaller points this is usually the merchant of whom the farmer buys his supplies, and who pays for the poultry and eggs in trade. At larger points there are likely to be, besides the merchant one or more persons who give their whole attention to buying farm produce, and in many cases to buying poultry produce alone. Such a buyer usually pays a little less than the merchant gives in trade, but is able to handle a considerable volume of business because he makes immediate payment in cash. To be a really efficient member of the poultry industry a buyer should give his quotations only on a quality basis and provide himself with refrigerator facilities.

Whether the buyer is a merchant, an independent produce man, or an agent of the packer or distributor, his is the first step in the gathering and concentrating of a gigantic crop of highly perishable products, aggregating hundreds of millions in value, from very many farms whose average yearly sales probably amount to a few hundred dollars at most. As indicated in Fig. 3, the original buyer may be any one of several classes of dealers, or in sparsely settled districts where concentration, assembly and grading are difficult, the

goods may pass through the hands of as many as three classes of buyers before the work of distribution is begun.

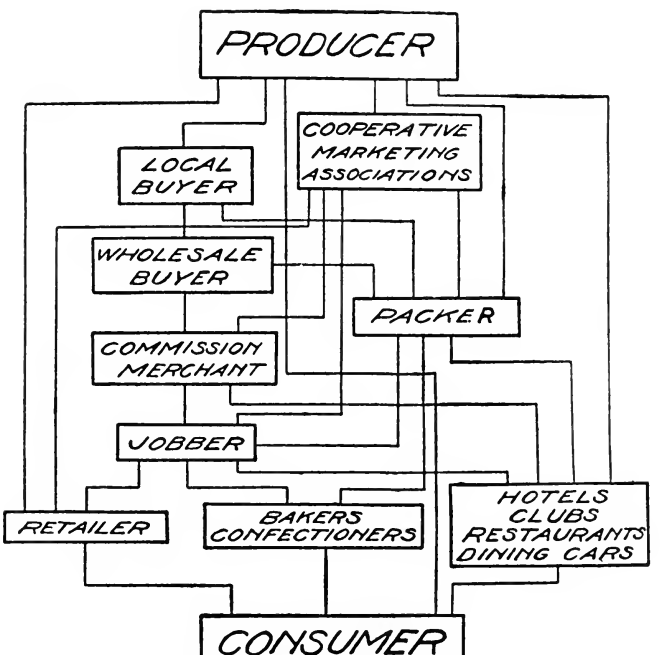


Fig. 3.—Showing routes by which poultry products reach the consumer from the producer.

The Packer—The function of a packer is to prepare food products for preservation and consumption, and to preserve them. The home killing of poultry for general consumption is passing just as the home slaughtering of beef and pork has largely given way to the slaughterhouses of the large packing centers.

The states of Kansas, Iowa, Nebraska, Missouri, Minnesota, Indiana and Tennessee are those in which the poultry-packing business has shown the greatest development. While it is carried on to a greater or less extent in all the states, most of the establishments dressing poultry or shipping eggs are small, without adequate equipment and employing only the crudest methods.

The present tendency is toward centralized plants having all the facilities of a first-class packing establishment, of which mechanical refrigeration is the most fundamental item.

Aside from dressing and preserving poultry, eliminating the bad eggs (which, under the present general system of buying eggs from producers without regard to quality, are bound to find their way into the channels of trade), and preserving the good ones, the packer has been forced by the exigencies of the business to take up the work of fattening and finishing the poultry before killing it.

The Distributor—As indicated in Fig. 3, poultry products may reach the consumer by various routes. In a very small proportion of cases the producer deals with the consumer direct, and is also a distributor. In an increasing, though still small, number of cases, the local buyer is a merchant who retails the products at the place of production. In the great majority of cases, however, both eggs and poultry reach the consumer by a more circuitous route. After the products have been concentrated in the hands of the wholesale

buyers, including the packers, they may be turned over to a commission merchant or broker, who disposes of them to the jobber in quite large quantities. The jobber in turn distributes them among the various retailing agencies, which include the retail markets, bakeries, confectioneries, hotels, clubs, restaurants, dining cars, the steamship dining service, and the like, which deal directly with the consumer.

There are numerous modifications of this route. One or more of these steps in distribution may be eliminated, as would be the case if a local buyer or co-operative marketing association dealt directly with the packer or the retailer in sparsely settled sections, or the packer sold to a hotel, but the great bulk of the goods at present passes through the several steps indicated at the left of Fig. 3. The fundamental reason for this is that the value of the individual unit in poultry is so small that it is cheaper to pass assembling and distribution through several hands than to integrate all services of slaughter, dressing, grading, packing, transportation, etc., under one head. In other words, the poultry trade of a retail store or of a hotel, club or restaurant is so small that the time of a single employe required to perform necessary services costs out of all proportion to the volume of poultry handled.

The Magnitude of the Poultry Industry—The 1911 report of the Secretary of Agriculture placed the national annual income from poultry products at $750,000,000, or approximately the combined value of the gold, silver, iron and coal mined the same year. The report of the 1920 census places the national annual income from eggs produced and poultry raised at a little over $1,047,000,000, leaving the production of the villages, towns and cities unaccounted for.

The census figures for the different states, while incomplete, are fairly comparable, because of the fact

that the same method was used in securing them in each of the several states. The first ten states in point of value of poultry and eggs produced are shown in Table 2.

Table 2.—The Rank of the First Ten States with Reference to the Value of the Total Production of Eggs and Chickens in 1919.

Rank	State	Total Value Chicken Producers
1	Iowa	$70,212,644
2	Illinois	67,690,085
3	Missouri	66,271,029
4	Ohio	64,109,133
5	Pennsylvania	53,709,243
6	Indiana	52,765,970
7	Kansas	44,199,844
8	Texas	43,303,622
9	New York	42,841,499
10	California	40,341,744

Comparative Numbers of Different Species of Poultry—Chickens are of pre-eminent importance among the various species of poultry. The total number of poultry found on the farms of the United States January 1, 1920, was 372,825,264 birds. Of these 96.4 percent (359,537,127) were chickens; a little over 1 percent (3,627,028) were turkeys; less than .75 percent (2,817,624) were ducks; a trifle over .78 percent (2,939,203) were geese; while the total for guineas (2,410,421), pigeons (1,493,630) and ostriches (231) was slightly over 1 percent (3,904,282).

Although 90.5 percent of all the farms of the United States reported chickens, there was but .3 percent that reported any species of poultry that did not report chickens. From 1910 to 1920 the number of chickens in the United States increased 28.2 percent, while during the same period the number of turkeys, ducks and geese decreased 1.7, 3.1 and 33.7 percent respectively.

It should be noted in this connection, however, that the figures of 1910 and 1920 are not strictly comparable. This is owing to the fact that the 1910 enumeration was made April 15, and takes into account no chickens under three months of age, while the enumeration of 1920 was as of January 1. The absolute gain in the number of chickens was undoubtedly less than the foregoing would indicate while the decreases of the other species were probably greater.

The popularity of the chicken is due to the fact that it furnishes a convenient source of fresh meat on the farm, and is, almost universally, a greater egg producer than are other sorts of poultry.

Eggs the Principal Poultry Product—Eggs are the primary poultry product. The average state income from poultry products sold in 1919 was $10,699,704, of which only $2,443,318 was credited to poultry carcasses sold, while $8,256,386 or considerable over three-fourths of the total income was credited to eggs.

At the same time the average annual farm income from eggs for all the farms in the United States was $98.95, as shown by the census of 1920, and the income from carcasses sold was $44.37, or considerably less than half as much.

The reason for this difference probably lies in the uniqueness of eggs among human foods, their high digestibility, healthfulness, and general attractiveness. It is likely to continue until some economic condition arises whereby the poultry carcass becomes more highly valued by the general public, in comparison with the egg, than at present. In the light of recent discoveries concerning their content of food accessories or vitamins, eggs are likely to increase in esteem, rather than decrease.

Although the eggs of ducks and guineas find their way into the regular channels of trade, their number

is so small when compared with the number of hens' eggs as to make them practically a neglible quantity. Turkey and goose eggs are used for hatching purposes only.

Farm Incomes from Poultry—The importance of a state as a factor in an industry and the importance of that industry to the state in the case of poultry production, are very different matters. While California, for instance, ranks tenth in the total state income from poultry products, she ranks first in the average farm income derived from poultry.

According to the 1920 census report the average farm income from poultry products sold in the United States was $143.33. Figures are not available which show what proportion of the average total farm income the average income from poultry is, but it seems reasonable to suppose it will generally be greatest in those states whose average farm income from poultry is largest. The ten states showing the largest average farm incomes from poultry sold are listed according to their income in Table 3.

Table 3.— The Relative Rank of the First Ten States with Reference to the Average Farm Income from Poultry.

Rank	State	Average Farm Income Poultry Products Sold
1	California	$636.86
2	New Jersey	399.02
3	Rhode Island	374.67
4	Massachusetts	374.29
5	Utah	329.82
6	Conneticut	282.07
7	Washington	252.59
8	New Hampshire	250.71
9	Delaware	234.83
10	Nevada	229.92

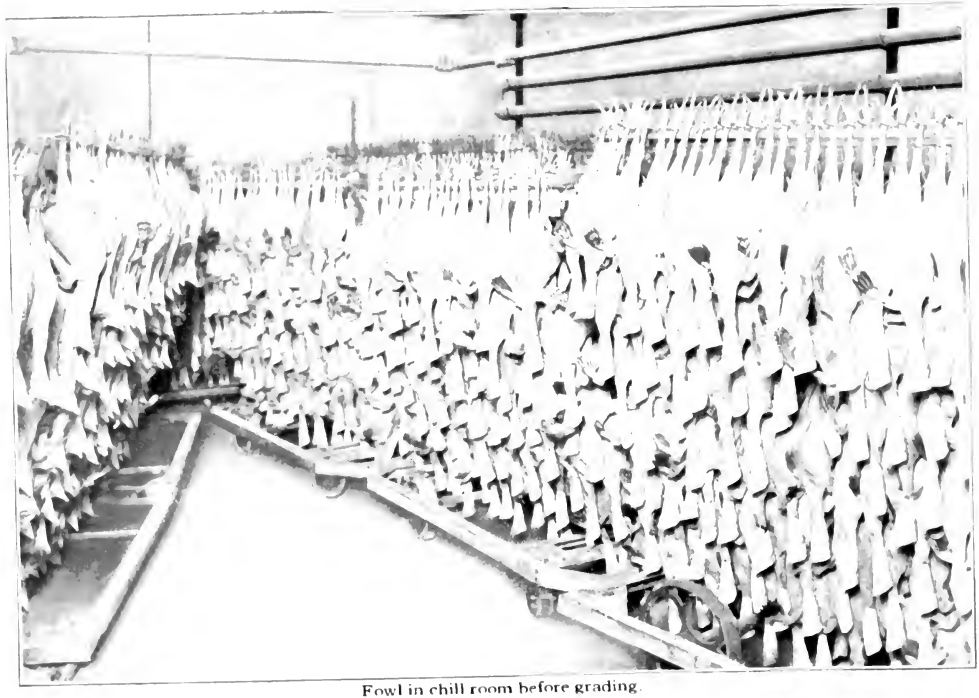
In addition to the cash income, the poultry products consumed on the farm must be considered. The average quantities of home produced meats (including eggs) consumed in 1920 by 955 families (average size

4.8 adults or equivalent), in fourteen states was reported in Farmers Bulletin 1082, to be as shown in Table 4. Poultry and eggs furnish 39 percent of the home produced meat food.

Table 4.—Home-Produced Meat Foods Consumed Annually by Farm Families.

	Pounds
Pork and lard	499
Beef	97
Poultry	226
Eggs	156
Total	978

Fattening chickens by milk-feeding in crates at an Armour plant.



Fowl in chill room before grading.

Chapter XI

Poultry and Egg Prices

Prices of Eggs—According to Pennington and Pierce in the 1910 yearbook of the Department of Agriculture, the output of eggs is steadily growing, but the demand is growing even faster than the supply, due to the increased preference for eggs as food; hence their price has risen. In 1899 the farm price was 11.15 cents per dozen, as an average for the United States; in 1909 the average was 19.7 cents, weighted according to monthly production.

The average farm price per dozen eggs on the first day of each month from January, 1910, to December, 1921, is shown in Table 5.

Table 5.—Department of Agriculture Average Farm Price per Dozen Eggs on the First of Each Month Since 1910.

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	Average
January	30.5	30.4	29.5	26.8	30.7	31.6	30.6	37.7	46.3	57.2	64.8	61.1	39.8
February	28.9	22.1	29.1	22.8	28.4	29.2	26.8	35.8	49.4	48.3	56.9	49.6	35.6
March	22.9	16.5	24.5	19.4	24.2	21.3	21.2	33.8	40.4	33.1	46.6	29.2	27.8
April	18.6	14.9	17.8	16.4	17.6	16.6	17.9	25.9	31.2	34.3	38.8	20.4	32.5
May	18.6	14.7	17.1	16.1	16.8	17.1	18.1	30.0	31.0	36.8	37.4	30.2	22.8
June	18.3	14.5	16.7	16.9	17.3	16.6	19.0	31.1	29.8	38.6	37.0	19.4	22.9
July	18.2	14.2	16.7	17.0	17.6	16.8	19.7	28.3	30.7	36.8	36.7	22.0	22.9
August	17.6	15.5	17.4	17.2	18.2	17.0	20.7	29.8	34.4	39.3	40.0	26.6	24.5
September	19.4	17.4	19.1	19.5	21.0	18.7	23.3	33.2	36.4	41.0	44.2	30.4	27.0
October	22.4	20.0	22.0	23.4	23.5	22.3	28.1	37.4	41.6	44.7	50.1	34.2	30.8
November	25.3	23.5	25.9	27.4	25.3	26.3	32.2	39.4	47.1	54.0	56.9	44.2	35.6
December	29.0	28.7	29.7	33.0	29.7	30.6	38.1	43.3	55.0	61.9	65.0	51.1	41.3
Average	20.8	17.3	20.2	19.3	20.5	19.8	22.2	31.9	36.1	40.4	43.7	28.4	26.7

Note.—The averages for the year are based upon the following "weights" for the monthly prices: January, February, December, each 4; March, 9; April and May, each 15; June, 13; July, 10; August, 8; September, 7; October, 6; November, 5. These figures represent, approximately, the normal relative sales at each monthly price.

Prices of Poultry Products—As indicative of the advance in prices of poultry as well as eggs during the last twenty-four years, the weighted average New York prices (estimated), furnished by the "Urner-

Barry Company", New York City, are given in Table 6. These prices represent those paid wholesale receivers by jobbers for western products, all grades considered except extras in the case of eggs.

Table 6.—Weighted New York Average Prices (Estimated) on Eggs, Live and Dressed Poultry for the Years 1896 to 1921, inclusive.

Year	Eggs	Live Poultry	Dressed Poultry
1896	14.00	9.00	10.00
1897	14.50	8.50	9.00
1898	15.50	8.80	9.10
1899	17.00	9.80	11.00
1900	16.00	9.30	10.00
1901	18.00	9.50	11.00
1902	20.00	11.50	14.50
1903	18.50	12.50	15.50
1904	20.00	12.50	15.00
1905	20.00	13.00	16.00
1906	19.00	12.80	15.00
1907	18.50	13.80	15.50
1908	19.00	13.50	15.80
1909	23.50	16.00	18.30
1910	23.00	17.00	19.80
1911	19.30	15.00	17.80
1912	22.80	15.50	18.30
1913	21.60	16.00	18.50
1914	23.10	16.20	17.50
1915	22.40	15.70	16.20
1916	26.00	18.75	20.25
1917	37.00	24.00	23.00
1918	42.00	33.00	30.00
1919	48.00	32.00	37.00
1920	52.40	35.40	38.20
1921	36.50	28.90	35.20

Storage and Egg Prices—During these same years the Chicago prices into and out of storage are shown in Table 7. These figures were obtained through the courtesy of Paul Mandeville, Merrill and Eldredge, and S. S. Borden Co., Chicago.

Table 7.—Cost of Storage Packed Eggs into Store, f. o. b. Chicago

Year	April	May	June
1896	9¼ to 11½	8½ to 11	10½ to 11½
1897	8½ to 9¼	8¾ to 11	9¼ to 10½
1898	9 to 10¾	9 to 11½	9½ to 12
1899	11¼ to 13½	12 to 15	13 to 14½
1900	10¾ to 11½	10½ to 13	11½ to 14
1901	12 to 13¼	11 to 11¾	10½ to 12½
1902	14½ to 17	15½ to 16½	15½ to 17
1903	14½ to 15½	15 to 16	14½ to 16
1904	16½ to 18	17½ to 18	16½ to 18
1905	16¾ to 17½	16 to 17	14¾ to 15¾
1906	15½ to 18	15 to 16¼	15½ to 16½
1907	16½ to 17½	16 to 17½	15 to 15½
1908	15 to 16¼	16 to 16½	16 to 17
1909	18½ to 22½	21 to 22½	19½ to 21
1910	21 to 22¼	19¾ to 21	19 to 20
1911	15½ to 17½	16 to 17¼	15 to 16
1912	19½ to 21½	19 to 20¼	18½ to 19½
1913	18½ to 19	18½ to 19½	18 to 19
1914	19 to 19¾	18¼ to 19¾	19 to 19½
1915	19½ to 20½	18½ to 19¾	18 to 19
1916	20¾ to 22⅓	21½ to 22½	21½ to 22¾
1917	30¾ to 36¾	34 to 36¼	30½ to 35⅛
1918	33¾ to 36	33 to 35½	32 to 36
1919	41¼ to 44	42½ to 46	38½ to 43
1920	43 to 45¾	42 to 45	40½ to 42¼

Selling Price of Aprils and Northern Mays, Including Carrying Charges f. o. b. Chicago.

Year	October	November	December
1896	14 to 15	15 to 17	13 to 17
1897	13 to 13½	11½ to 13½	12 to 15
1898	13½ to 14½	14 to 16½	16 to 19
1899	16 to 16½	15 to 16	13 to 16
1900	15½ to 16½	15½ to 19	19 to 21
1901	16½ to 17	16½ to 18	18 to 20
1902	19 to 20	19 to 20	20 to 20½
1903	19½ to 20½	20½ to 25	24 to 29
1904	18 to 18½	18 to 21	19 to 21½
1905	19 to 20¼	20 to 20½	19 to 20½
1906	20 to 20½	20½ to 22½	20 to 24
1907	16¾ to 19½	15½ to 17	15½ to 17
1908	20½ to 22½	22½ to 25	23 to 27

Year	October	November	December
1909	22½ to 23¾	22 to 23¾	21 to 24½
1910	22½ to 23	22¼ to 23½	21 to 22¾
1911	18½ to 19½	19½ to 22	21 to 23
1912	22½ to 23½	21 to 22½	17½ to 21
1913	23 to 26¼	25 to 28	25 to 30½
1914	20 to 22¾	20½ to 24	20 to 25½
1915	22¾ to 23½	20¾ to 23¼	20½ to 22
1916	26½ to 30¼	30 to 37	28 to 34¼
1917	32½ to 37	30 to 33½	31 to 41
1918	39½ to 44½	43 to 44½	42½ to 45
1919	44 to 47	46 to 48	47¼ to 50
1920	46 to 50	48 to 56½	56 to 59

On the average it will be seen that by storage the price of eggs per dozen is increased from two to six cents, averaging somewhat above three. When one considers the cost of maintaining cold storage warehouses, the expense involved in grading and sorting, and the regular loss due to spoilage and breakage, as well as the fact that only in this way can a year-around product be provided; this margin seems very reasonable in proportion to the services performed.

Chapter XII

Grades and Classes of Eggs.

Grades of Eggs—The different kinds and degrees of deterioration have led to the classification of eggs into generally recognized commercial grades known as firsts, seconds, checks, leakers, spots, blood rings and rots. The grading is done by means of a "candle." Candle is the name given to an egg tester when it is used in connection with market eggs. It operates on precisely the same principle as the lamp tester usually sent by incubator manufacturers, and usually consists of a tin can with a hole in the side and an electric light bulb inside.

In addition to the foregoing many markets have additional grades such as the "Extra Fancy" or "Near-by Hennery Whites" which are furnished by producers in the territory immediately surrounding.

Firsts—A first is the nearest approach to a fresh egg that is known to the general egg trade. Besides being new laid it must be clean and unwashed, average very close to 45 pounds to the thirty-dozen case (1½ pounds per dozen), show a very small air cell, and a smooth, strong shell free from cracks. Only firsts are usually considered as fit for storage.

Seconds—Second-class eggs are those which are not up to standard in physical qualities or show a more or less marked deterioration in food qualities. The poor physical qualities that cause rejection for the first grade, without regard to its food qualities, are lack of size, being dirty, stained, washed or having a markedly rough or misshapen shell.

The kinds of deterioration in food quality and which render them unfit for successful preservation by storage or preservative compounds are evidences of heating,

shrinkage, blood clots and discoloration of the albumen giving what are known to the trade as "grass" eggs.

Checks—Checks are cracked eggs. Those in which the crack is small and the contents of the egg is still retained are called "blind checks." Where the contents are escaping they are designated as "leakers." Such eggs may be perfectly sweet and wholesome, but are extremely perishable, and are good for immediate consumption, or to be broken out and frozen.

Spots—Eggs in which mould or bacteria has developed in isolated areas inside the shell are called "spots." They are not fit for food. Eggs in which the yolk has adhered to the shell are also classed as spots, being known as "stuck spots." These eggs are unfit for food, but may be used for tanning purposes.

Blood Rings—In fertile eggs in which the embryo has so far developed as to show considerable blood and then died, the blood is usually left in a more or less imperfect circle surrounding the germ. Before the candle this appears as a pink ring which from its nature has given the name "blood ring" to eggs containing dead germs. These eggs are declared by the government authorities to be unfit for human food and are a total loss, except that in the vicinity of tanneries they may be disposed of at a very low price for use in tanning certain classes of leather goods.

Producing Good Eggs—While it is possible to keep a good egg, that is produced in March and April, good until mid-winter, a good egg cannot be made from a poor one. During the spring month before the hot weather sets in most of the eggs marketed arrive in fairly good condition but with the onset of warm weather the situation is much changed and eggs reach the packing house in considerable numbers that are

not only not fit for storage but are actually unfit for use as food at all.

The Bureau of Animal Industry has carried on investigations which show that the following simple precautions taken during the very hot weather resulted in the marketing of eggs which graded 97 per cent first class. These results were reported in Bulletin No. 160 of the Animal Husbandry Department, U. S. Department of Agriculture.

1. Infertile eggs were produced by keeping the males from the laying flock. As has already been suggested, this may be accomplished by disposing of the cockerels as broilers before they reach the breeding age, or by caponizing.
2. The hens were furnished plenty of roomy, clean nests.
3. The eggs were gathered twice daily.
4. They were kept in a cellar that was cool, dry and free from odors.
5. The eggs were taken to market twice a week, being carefully protected from the sun on the way to town.
6. The eggs that were small, dirty, misshapen or found in stolen nests were kept for home use.

Chapter XIII

Grades and Classes of Poultry

Market Classification of Live Poultry—The market grades and classes of poultry both alive and dressed vary somewhat in different parts of the country and with different packers. The classifications which follow are fairly representative of the general practice in this regard. Live chickens are classified according to sex, size, age or hardness of bone, into (1) broilers, (2) springs, (3) fowl, (4) stags, (5) capons, (6) slips, (7) roosters.

(1) A broiler is a young chicken of either sex weighing two pounds or under. (2) A spring is a young, soft-boned bird of either sex that weighs over two pounds. (3) A fowl is a hen (female over one year old), or a pullet that shows too much hardness in the breast bone (keel) to be classed as a spring. (4) Stags are cockerels that exhibit too much hardness of bone, development of spurs or comb to be classed as springs, but not enough to be classed as roosters. (5) Capons are cleanly castrated male birds. (6) Slips are birds upon which the operation of castration has not been entirely successful. (7) Roosters are cocks (male birds over one year old).

Chickens with black legs are discriminated against in the dressed poultry trade as the carcasses invariably have a large number of pin feathers.

Turkeys are classified as young (under one year) and old (over one year) toms, young and old hens, though some packers make the age distinction only in the case of the toms. Ducks are usually marketed as green (young) roasting ducks. Geese are classified as young and old, one year being the dividing point.

Grading eggs. The "Firsts" go into storage. The small or dirty ones are broken out and frozen or desiccated.

An egg breaking room is necessary in connection with every egg candling and packing establishment, in order that cracked, undersized or dirty eggs may be broken and preserved by freezing. Standardized products are thus made possible.

Grades of Dressed Chickens—The same terms do not always refer to the same weights in the dressed classification as they do in the live classification. In the following classification the weights are for a dozen birds in each case whereas the weights in the live classification are for single birds.

Class	Weight	Grade
Broilers	16 pounds and under	1st grade 2nd grade 3rd grade 4th grade
Broilers	17 to 20 pounds	1st grade 2nd grade 3rd grade 4th grade
Broilers	21 to 25 pounds	1st grade 2nd grade 3rd grade 4th grade
Broilers	26 to 30 pounds	1st grade 2nd grade 3rd grade 4th grade
Fryers (Also referred to as chickens commercially.)	31 to 36 pounds	1st grade 2nd grade 3rd grade 4th grade
Fryers	37 to 42 pounds	1st grade 2nd grade 3rd grade 4th grade
Roasters	43 to 47 pounds	1st grade 2nd grade 3rd grade 4th grade
Roasters	48 to 54 pounds	1st grade 2nd grade 3rd grade 4th grade
Roasters	55 to 60 pounds	1st grade 2nd grade 3rd grade 4th grade

Class	Weight	Grade
Roasters	Over 60 pounds	1st grade 2nd grade 3rd grade 4th grade

All of the foregoing came out of the broilers and springs of the live classification.

In addition some packers have a further classification called C Roasters packed in three weights, 42 pounds and under, 43 to 48 pounds and 49 pounds and higher which are the stags of the live weight classification. Others work the stags into the lower grades of roasters of the proper weights.

Class	Weight	Grade
Fowl	36 pounds and under	1st grade 2nd grade 3rd grade 4th grade
Fowl	37 to 42 pounds	1st grade 2nd grade 3rd grade 4th grade
Fowl	43 to 48 pounds	1st grade 2nd grade 3rd grade 4th grade
Fowl	48 to 54 pounds	1st grade 2nd grade 3rd grade 4th grade
Fowl	55 to 60 pounds	1st grade 2nd grade 3rd grade 4th grade
Fowl	Over 60 pounds	1st grade 2nd grade 3rd grade 4th grade

The foregoing are the fowl of the live weight classification.

Capons are divided into light and heavy with 72 pounds as the dividing point. Slips are sold in mixed weights as are also old roosters.

The several grades of the different classes and weights are usually sold under various trade names or brands by different packers. In general the first grade chickens show the full effect of milk feeding, have the perfect bleach which comes from such feeding and are free from all blemishes, very even in quality and size. They are suitable for the most discriminating trade. The second grade also shows the full effect of milk feeding and is similar to the first grade except that it may show slight defects in dressing.

The third grade are milk fed but do not show the full effects of the feeding. Birds that show pin feathers or other marked defects in dressing are included. In the fourth grade are included birds that are extremely pin feathery, have torn skin, broken wings or are deformed.

Grades of Dressed Turkeys—Turkeys are packed according to their live weight classification in three grades—namely No. 1, No. 2 and culls.

Picking, Packing and Shipping—When received at the packing house all broilers and springs are milk fed in crates or batteries, for at least ten days and all fowl for at least five days. Other classes of poultry are not fed. On the last morning of the feeding period the birds are given nothing but water which is kept before them from early morning until they are sent to the killing floor. This is for the purpose of flushing out their crops.

After the birds are killed by sticking and neatly picked, their heads and feet are washed, and their heads wrapped in parchment paper. They are then placed on racks and taken to the chill room which is held at a temperature of 33° to 35° F. They are kept in this room until their internal temperature does not exceed 35° F., which usually takes at least 24 hours.

From the chill room they are taken into the grading room where they are sorted according to quality and size.

All broilers and fryers up to 36 pounds to the dozen are individually wrapped in parchment paper and packed one dozen to the box. Fryers over 36 pounds, roasters and fowl are not wrapped but are packed one dozen to the box.

When the birds are finally graded and packed they are put in a cooler of not over 33° F. temperature. The boxes are placed upside down and held until enough stock is accumulated to make a carload. During the summer months poultry is placed in a freezer below zero and hard chilled for 72 hours. While this does not freeze the birds clear through it stiffens them to such a degree that they can be shipped a considerable distance without spoilage.

The receiver of poultry must be extremely careful as to the manner in which he handles it. It should be put immediately into a cooler of not to exceed 33° F. unless the stock is sold the day of arrival. Where there are facilities for holding the poultry at a temperature below freezing they should be made use of without fail. In either event great care must be taken that the temperature does not fluctuate, for poultry held at 15° one day and 25° the next, is practically sure to mould.

Principal Poultry Outlets—Seventy-five to eighty percent of the poultry handled by the packing houses is marketed in the east, particularly in Boston, New York, Philadelphia and surrounding territory. Broilers are largely consumed by hotels and restaurants. The bulk of the frying chickens are exported, England taking by far the most of them. Roasting chickens are consumed by all classes of trade, but particularly the eastern and southern resorts. The fowl are consumed by all classes and conditions of trade.

Relation of Price to Grade—Poultry that costs 18 cents alive delivered at the packing house becomes a finished product at a cost of at least 7 cents a pound. This seven cents covers the milk feeding cost, dressing, shrinkage, picking and packing labor, refrigeration and other overhead expenses. A carload of live poultry costing 18 cents into the packing house will come out at about 25 cents packed as an average of all grades.

The percentage of the different grades of dressed poultry coming out of the average car of live poultry varies with different packers because the severity of the grading varies. Some houses set a very high standard for the first grade and get less than 18 percent firsts. On the average, however, there will usually be about 25 percent first grades, 55 percent seconds, 15 percent thirds and five percent fourth grades and rejects (birds unfit for consumption which are burned).

On the basis of the percentages given, when the average price is 25 cents, the first grade should move at about 32 cents, the second grade at around 30, the third at around 24 cents, with the fourth grade bringing about 18 cents. Prices are fixed by the supply on the one hand and market demands on the other, both of which vary and at times some grades and classes will be quite out of line with the foregoing, but it is fairly representative of the relative levels of market quotations.

Chapter XIV

The Seasonal Trade in Poultry Products

The Seasonal Production of Eggs—According to the Bureau of Statistics, United States Department of Agriculture, as shown in their Bulletin No. 101, 49.8 percent or practically half of the egg crop of the United States is produced in the four months of March, April, May and June, though July and August are usually counted as part of the egg season. The flush (point of highest production) usually falls in April though in 1906 and 1909 it fell in May.

This date is somewhat earlier in the southern states than in the northern. The heavy lay in Tennessee and Kentucky is from December until April. In March and April, southern Ohio and Missouri stocks appear on the market, helped along by Texas, southern Missouri and southern Kansas. In the later spring, northern Kansas, Iowa, Indiana, Illinois and the Central States generally have their heavy producing season, and it is when this occurs that eggs are best and most plentiful. Minnesota and Michigan with a still later season, help out somewhat when the supply of the central states begins to fail.

The mean percentage of the national egg crop produced each month is shown in Table 8 and presented graphically in Figure 4.

Table 8.—The Mean Percentage of the National Egg Crop Produced Each Month.

January	6.6	July	9.6
February	7.1	August	8.6
March	12.4	September	6.2
April	13.4	October	4.2
May	13.3	November	3.1
June	10.7	December	4.3

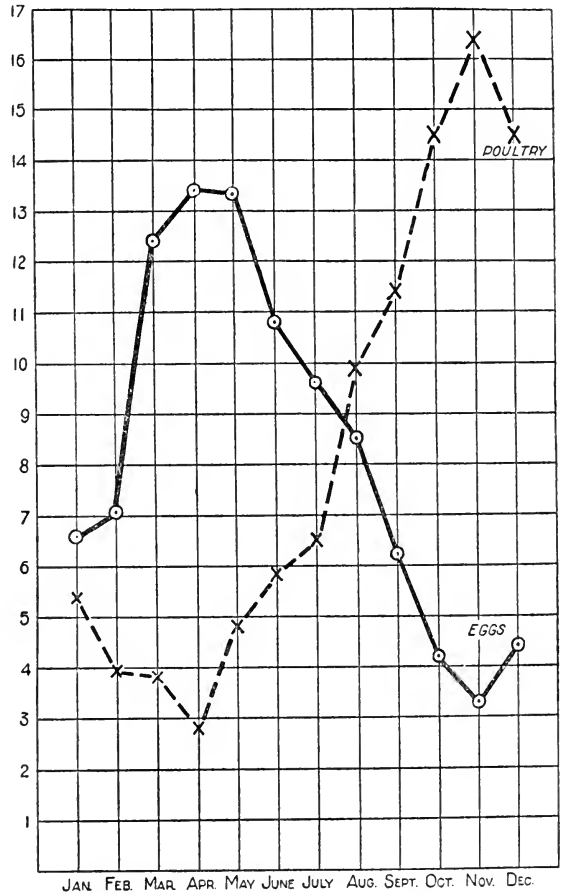


Fig. 4.—Graphic presentation of the mean percent of the national egg crop produced each month, and of the mean percent of poultry receipts at a central western packing house each month for the period 1910 to 1920, inclusive.

The Seasonal Marketing of Poultry—The poultry season usually begins in July and lasts until about the first of January. The most of the broilers are accumulated and stored during July and August. The season for storing frying chickens is roughly September and October, while the year's supply of roasting chickens and fowl are accumulated during the months of October, November, December and to some extent in January, with the heaviest receipt falling in November. The mean percentage of the annual poultry crop marketed each month, as indicated by packing house receipts is shown in Table 9 and presented graphically in Figure 4.

Table 9.—Mean Percent of the Annual Poultry Crop Marketed Each Month as Shown by the Receipts at a Central Western Packing House for the Period 1910 to 1920 Inclusive.

January	5.41	July	6.50
February	3.98	August	9.88
March	3.81	September	11.46
April	2.85	October	14.49
May	4.82	November	16.45
June	5.86	December	14.49

It must be understood that these seasons are longer and are hardly so clearly defined as the seasons for strawberries and vegetables. They are sufficiently marked, however, so that during the egg season practically the whole force at a packing establishment is employed in packing eggs. The transition from the egg season to the poultry season is somewhat gradual, but in October, November and December the whole force is busy packing poultry.

This discussion, of course, applies to the general condition. Both eggs and poultry may be and are produced out of season.

Out-of-Season Products—Specialized poultry farms east and west, and indeed in increasing numbers

in the central states make a practice of furnishing poultry products out of season. Very many general farms secure a few eggs during the winter, and with a little care and attention may get more. As previously noted, however, farmers specializing on out-of-season broilers and eggs bear much the same relation to the general production of poultry that truck gardeners who raise radishes, lettuce, and tomatoes under artificial heat bear to the general production of vegetables. Fresh winter eggs, like winter radishes and lettuce, are out of season products and must be paid for as such. For most persons, the fruit and vegetables eaten in winter must be preserved by canning and saved over from the previous season. The eggs eaten out of season by most of the consuming public must also be preserved, usually in cold storage.

The Turkey Season—Ninety-five percent of the turkeys are killed, dressed and marketed during November and December. About seventy-five percent of all the turkeys consumed in the United States are sold for the Thanksgiving and Christmas trade. A comparatively small quantity marketed at Christmas time, is stored. The Thanksgiving turkeys are usually not fully grown or fat. The extra month's feed gives them a much better finish. They can then be successfully frozen, and thaw out bright and clear. This freezer stock is used almost exclusively by the hotel trade, some of the larger hotels having turkey on their menu the year around.

Chapter XV

The Import and Export Trade

Imports and Exports of Eggs—For the five years ending June 30, 1920, the average annual imports of eggs were only 1,131,602 dozens. During the same period the average annual exports of eggs were 27,400,313 dozens. These figures refer to eggs in the shell. A rather recent development is the importation of considerable quantities of dried and frozen eggs, chiefly from China. During the five years ending June 30, 1920, the average annual imports of this class of goods were 12,822,693 pounds valued at $3,727,661. During the same period the average value of the exports of the same class of goods was only $286,425.

Table 10.—Import of Eggs into the United States, by Countries, for Fiscal Years Ending June 30[1]

Years	Denmark (doz.)	Germany (doz.)	Russia (doz.)	United Kingdom (doz.)	Austria-Hungary (doz.)	Roumania (doz.)	Canada (doz.)
1906	.....	.....	.....	53	.....	.....	16,520
1907	10	.....	.....	181	.....	.....	33,121
1908	3	.....	.....	59	.....	.....	28,022
1909	1,816	3	.....	128	.....	.....	55,301
1910	5	12,001	360	498,786	.....	.....	39,810
1911	.....	562	.....	1,280,486	.....	.....	35,272
1912	.....	4	.....	688,915	.....	.....	25,817
1913	.....	10	.....	1,127,531	.....	.....	16,894
1914	5,880	1,847,237	388,632	360,872	1,009,028	57,14	356,962
1915	35,080	64,200	3,540	12,756	.....	.....	735,625
1916	.....	.....	.....	.....	.....	.....	225,708
1917	.....	.....	.....	752	.....	.....	441,151
1918	.....	.....	.....	.....	.....	.....	778,200
1919[2]	.....	.....	.....	1	.....	.....	325,846
1920[2]	.....	.....	.....	68	.....	.....	276,392
1921[2]	.....	.....	.....	120	.....	.....	794,068

[1]Statement prepared by foreign markets service, bureau of markets.
[2]Calender year.

Table 10 (Cont'd)—Imports of Eggs into the United States, by Countries, for Fiscal Years Ending June 30[1]

Years	Mexico (doz.)	Argentina (doz.)	China (doz.)	Hong kong (doz.)	Japan (doz.)	All other (doz.)	Total (doz.)
1906	2,250	.....	100,861	120,750	600	.....	241,034
1907	925	.....	85,431	111,801	380	10	231,859
1908	431	.....	91,386	111,375	25	188	231,939
1909	17,200	.....	98,817	114,778	522	85	288,650
1910	10,458	.....	130,326	123,458	3,000	63	818,267
1911	3,135	.....	122,015	130,357	50	1,517	1,573,394
1912	14,047	.....	114,958	122,364	990	5,958	973,053
1913	500	.....	95,639	124,110	1,405	1,137	1,367,226
1914	4,663	.....	1,895,618	69,079	7,915	12,929	6,014,955
1915	67,404	.....	2,035,862	85,744	5,670	750	3,046,631
1916	1,855	15,000	320,718	161,464	7,821	.....	732,566
1917	200	.....	464,568	159,116	44,465	70	1,110,322
1918	5	.....	479,617	121,223	236,420	3,604	1,619,069
1919	.....	90	474,502	240,286	84,086	122,550[3]	1,247,355
1920	.....	21,000	846,863	269,567	84 755	210,056[4]	1,708,701
1921	210	309,000	1,131 514	475,422	232,737	119,530[3]	.....

[1]Statement prepared by Foreign Markets Service, Bureau of Markets.
[3]Australia.
[4]Australia 209,718 dozen.

Table 11.—Exports of Eggs from the United States, by Countries, for Fiscal Years Ending June 30[1]

Year	United Kingdom	Canada (doz.)	Panama (doz.)	Mexic (doz.)
1906	182,570	425,648	113,380	776,271
1907	2,770	742,220	288,027	941,807
1908	197,720	1,159,626	553,225	930,775
1909	7,275	866,609	591,374	631,194
1910	910	868,454	591,673	585,540
1911	2,330	2,457,188	848,667	688,022
1912	58,470	8,697,568	791,065	776,459
1913	51,055	12,856,690	818,470	847,615
1914	6,001	9,064,948	794,286	485,842
1915	7,395,143	6,116,988	621,250	143,693
1916	8,255,909	7,916,534	852,960	447,818
1917	4,359,192	10,850,678	849,508	1,170,450
1918	3,679,795	5,216,179	681,921	1,301,495
1919	12,330,488	3,091,982	737,830	2,091,073
1920	11,521,631	11,014,980	618,065	1,521,573
1921[2]	4,062,881	7,350,732	831,105	5,936,196

[1]Statement prepared by Foreign Markets Service, Bureau of Markets.
[2]Calendar year.

Table 11 (Cont'd)—Exports of Eggs from the United States, by Countries, for Fiscal Years Ending June 30[1]

Year	Cuba (doz.)	Argentina (doz.)	Other Countries (doz.)	Total (doz.)
1906	3,275,391	.....	178,803	4,952,063
1907	4,889,701	.....	104,460	6,968,985
1908	4,682,950	.....	66,681	7,590,977
1909	3,055,706	.....	54,993	5,207,151
1910	3,220,037	.....	59,322	5,325,936
1911	4,499,211	.....	83,294	8,558,712
1912	4,999,958	.....	91,089	15,405,609
1913	5,721,200	1,5000	112,860	20,409,390
1914	5,651,261	.....	146,511	16,148,849
1915	5,290,945	955,234	261,171	20,784,424
1916	8,046,128	567,173	309,684	26,396,206
1917	7,447,257	24,330	225,000	24,926,424
1918	7,996,499	60	93,218	18,969 167
1919	9,804,376	.....	329,034	28,384,783
1920	12,402,771	.....	1,247,966	38,326,986
1921[2]	15,015,726	.....	94,647	33,291,287

[1]Statement prepared by Foreign Markets Service, Bureau of Markets.
[2]Calendar year.

Table 12.—Imports of Dried and Frozen Eggs, for Fiscal Years Ending June 30

Year	Pounds	Value
1910	869,923	$56,121
1911	433,405	30,798
1912	43,822	4,430
1913	228,305	36,892
1914	3,420,412	504,619
1915	8,571,758	798,129
1916	6,021,672	921,502
1917	10,317,744	1,732,948
1918	14,597,503	4,057,417
1919	9,085,449	3,143,190
1920	24,091,098	8,783,258
1921[1]	17,898,019	3,166,701

[1]Calendar year.

Table 13.—Exports of Dried and Frozen Eggs, for Fiscal Years Ending June 30

1910	$ 3,585
1911	5,353
1912	29,541
1913	67,854
1914	47,968
1915	88,865
1916	210,265
1917	72,491
1918	525,880
1919	341,304
1920	282,198
1921[1]	155,917

[1]Calendar year.

Exports of Poultry—Unfortunately no statement of the imports of poultry seems to be available and the only report of the exports is in combination with a report of the exports of game. The total value of the exports of poultry and game is given for each year from 1906 to 1920 in Table 14.

Table 14.—Total Exports of Poultry and Game from the United States for the Fiscal Years, Ending June 30

1906	$1,397,004
1907	1,086,618
1908	881,792
1909	848,644
1910	599,548
1911	981,805
1912	697,955
1913	1,303,399
1914	913,632
1915	1,187,771
1916	1,561,398
1917	1,327,348
1918	1,241,144
1919	3,799,348
1920	1,627,633

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"Productive Poultry Husbandry,"
By H. H Lewis. Published by Lippincott Pub. Co., Philadelphia.

"Poultry Breeding and Management,"
By James Dryden. Published by Orange-Judd Pub. Co., New York.

"Poultry Culture, Sanitation and Hygiene,"
By B. F. Kaupp. Published by W. B. Saunders Co., Philadelphia.

"Poultry Breeding,"
By Miller Purvis. Published by Breeders' Gazette, Chicago.

BREEDING

"The Mating and Breeding of Poultry,"
By Harry Lamon and Robert Slocum. Published by Orange-Judd Pub. Co., New York.

"Pedigreeing Poultry," Circular No. 67,
Kansas Agricultural Experiment Station.

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"Cull the Flock." Circular 123, Wisconsin Agricultural Experiment Station.

"Culling Farm Poultry." Circular 93, Kansas Agricultural Experiment Station.

THE BREEDS

The Standard Varieties of Chickens.

I. THE AMERICAN CLASS. Farmers' Bulletin No. 806, U. S. Dept. of Agriculture.

II. THE MEDITERRANEAN CLASS. Farmers' Bulletin No. 898, U. S. Dept. of Agriculture.

"The Plymouth Rocks"
"The Wyandottes"
"The Orpingtons"
"Rhode Island Reds"
"The Leghorns"
"The Asiatics"
} Published by Reliable Poultry Pub. Co., Dayton, Ohio.

"Turkey Raising,"
Farmers' Bulletin No. 791, U. S. Dept. of Agriculture.

"Duck Raising,"
Farmers' Bulletin No. 697, U. S. Dept. of Agriculture.

"Goose Raising,"
"Farmers' Bulletin No. 767, U. S. Dept. of Agriculture.

HOUSES

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"Poultry Buildings,"
Bulletin No. 325, New Jersey Agricultural Experiment Station.

"Use of Artificial Light to Increase Winter Egg Production,"
Published by Reliable Poultry Publishing Company, Dayton, Ohio.

INCUBATION

"Natural and Artificial Incubation of Hens' Eggs,"
Farmers' Bulletin No. 585, U. S. Dept. of Agriculture.

REARING

"Rearing Chickens,"
Bulletin No. 96, Storrs (Conn.) Agricultural Experiment Station.

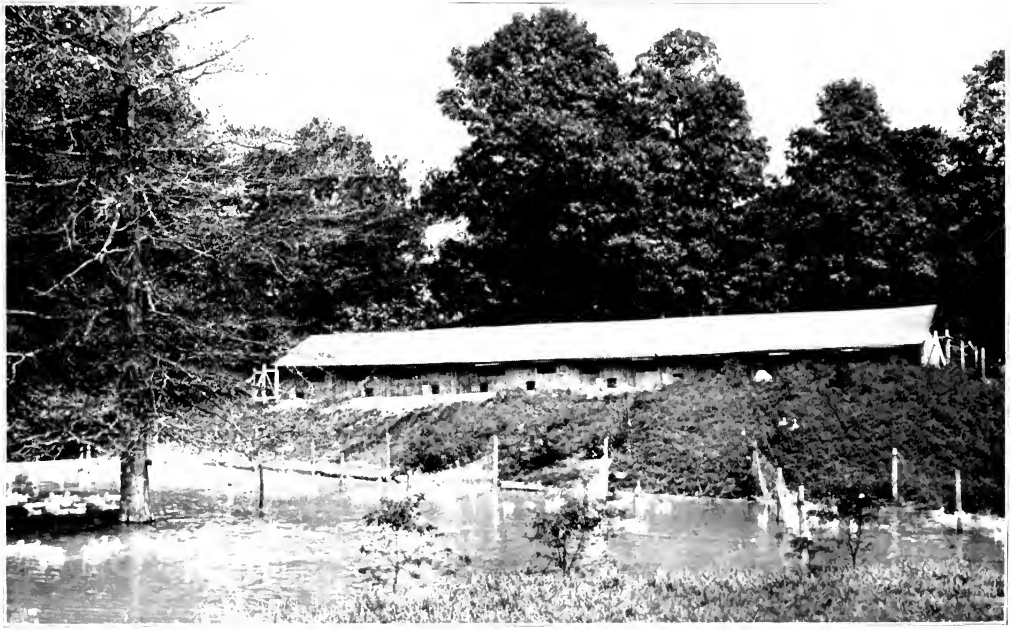
"Natural and Artificial Brooding of Chickens,"
Bulletin No. 624, Bureau of Animal Industry, U. S. Dept. of Agriculture.

PARASITES

"Mites and Lice on Poultry,"
Farmers' Bulletin No. 801, U. S. Dept. of Agriculture.

CONTENTS

Give the chickens a free range, fencing them out of places where they are not wanted.



Duck house and pond on an Indiana poultry farm.

National Poultry Associations

Buff Minorca Club, Edward F. Schmidt, *Secretary*, Hazelrigg, Ind.
Buff Minorca Club of America, Wm. F. Williams, *Secretary*, 1102 W. 52nd St., Los Angeles, Cal.
American Black Orpington Club, Ora Overholser, *Secretary*, Mechanicsville Md.
American White Orpington Club, J. I. Lysle, *Secretary*, 1200 E. 7th St., Plainfield, N. J.
National Rose Comb Orpington Club, E. M. Mengel, *Secretary*, Auburn, Pa.
National S. C. Buff Orpington Club, Harold N. Bush, *Secretary*, E. Stroudsburg, Pa.
American Barred Plymouth Rock Club, L. T. Robinson, *Secretary*, Union City, Mich.
American Buff Plymouth Rock Club, Jas. H. Hertz, *Secretary*, Hanover, Pa.
American Columbian Plymouth Rock Club, T. J. Enslin, *Secretary*, Hackettstown, N. J.
American White Plymouth Rock Club, G. A. Krueger, *Secretary*, Plummer, Minn.
International Partridge Plymouth Rock Club, Roy W. Sutton, *Secretary*, Minneapolis, Kans.
American Polish Fowl Club, Hiram W. Schriver, *Secretary*, Groton, Conn.
Rhode Island Red Club of America, W. H. Card, *Secretary*, Manchester, Conn.
Rhode Island White Club of America, Mrs. E. Alphonso, *Secretary*, Union, Mo.
National Bronze Turkey Club, Chas. E. Bird, *Secretary*, Meyersdale, Pa.
National Bourbon Red Turkey Club, Mrs. Minnie M. B. Brown, *Secretary*, Appleton City, Mo.
International Turkey Club, Mrs. Rea E. Fowler, *Sec'y*, Rochelle, Ill.
American Buff Wyandotte Club, M. M. Clark, *Secretary*, West Pawlet, Vt.
National Black Wyandotte Club, Bradley Cook, *Secretary*, Oley, Pa.
National Partridge Wyandotte Club, Paul D. Cahow, *Secretary*, 219 E. Liberty St., Ann Arbor, Mich.
National Columbian Wyandotte Club, Levi A. Ayres, *Secretary*, Box 760, Granville, N. Y.
Silver Wyandotte Club of America, A. E. Rettig, *Secretary*, 3724 E. 28th St., Brightwood, Ind.
International Silver Penciled Wyandotte Club, Fred F. Field, Jr., *Secretary*, Montello, Mass.
International Black Wyandotte Club, Ralph Roudebush, *Secretary*, Arcadia, Ind.
National White Wyandotte Club, E. B. Rose, *Secretary*, E. Stroudsburg, Pa.
Waterfowl Club of America, Stanley Mason, *Sec'y*, Albrightsville, Pa.